TECHNOLOGY DEPARTMENT

AVIATION WEEK

AUG. 4, 1947

COORDINATING AVIATION AND AVIATION NEWS

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DETROIT

Two great names make propeller history

• Two great names, American Airlines and Curtiss Propellers, join in introducing new comfort and safety to air travel. American's recent inauguration of DC-6 service between New York and Chicago marked the *first scheduled airline use of reversible propellers.*

• Reverse thrust means *smooth, air-cushioned landing, effective landing on wet or icy runways, backing or maneuvering without ground assistance, reduced brake and tire wear* . . . outstanding results of Curtiss propeller pioneering. The first of American's postwar fleet, the DC-6 will be followed by the Convair 240 and the Boeing 377, both of which will be equipped with Curtiss reversible propellers.

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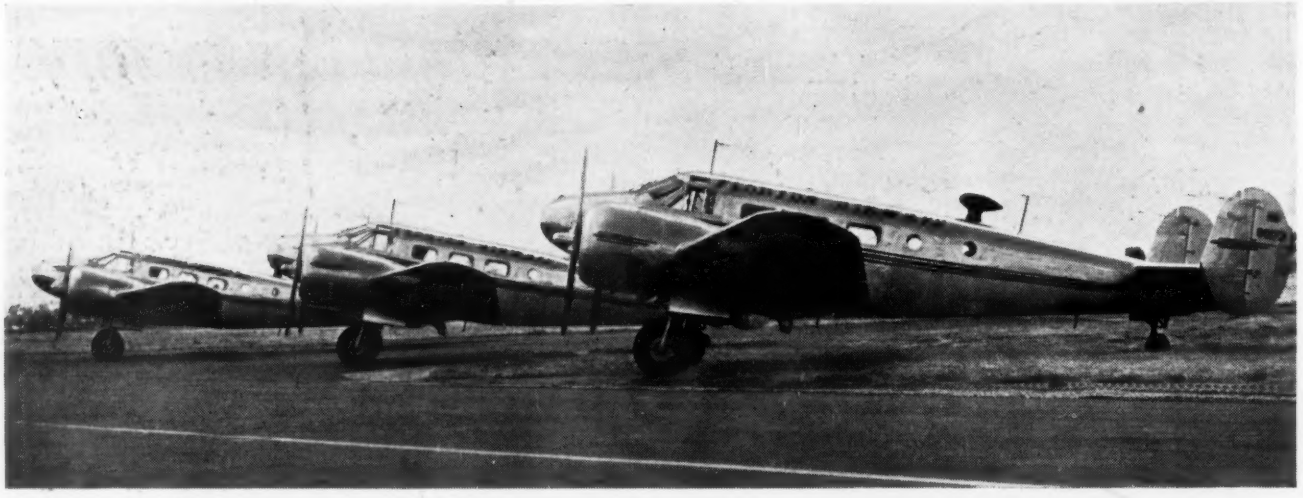
PROPELLER DIVISION CURTISS WRIGHT CALDWELL, N. J.

FIRST IN FLIGHT

Florida Flyer

PIONEERING in the untried regional type of air transport, Florida Airways, Inc., is proving the need for fast, efficient air transportation between smaller communities and their metropolitan areas. Florida Airways inaugurated its first certificated flights between Orlando and Tallahassee, on January 10, 1947. Since that time, additional routes have been added, serving more Florida cities and towns.



In 1946, the company was granted the first certificate ever issued by the CAB covering specific air service to smaller communities. Today this pioneer airline, operating as a full-fledged air carrier, plans to further expand its services, bringing the convenience and advantages of public air transportation to many more cities along Florida Airways routes.

Florida Airways, Inc., officials. (left to right) Thos. E. Gordon, President, Oscar Bergstrom, Gen'l. Traffic Manager, Arthur Wright, Director of Personnel.

Pioneer manufacturers of seamless steel tubing, The Ohio Seamless Tube Company has "grown up" with the aviation industry. An inherent desire to lead the way has been a predominant factor in establishing OSTUCO tubing as essential in the construction of all U.S.-built aircraft, and will continue to be a contributing force in the development of tubing designed to meet the needs of the progressive aviation industry.

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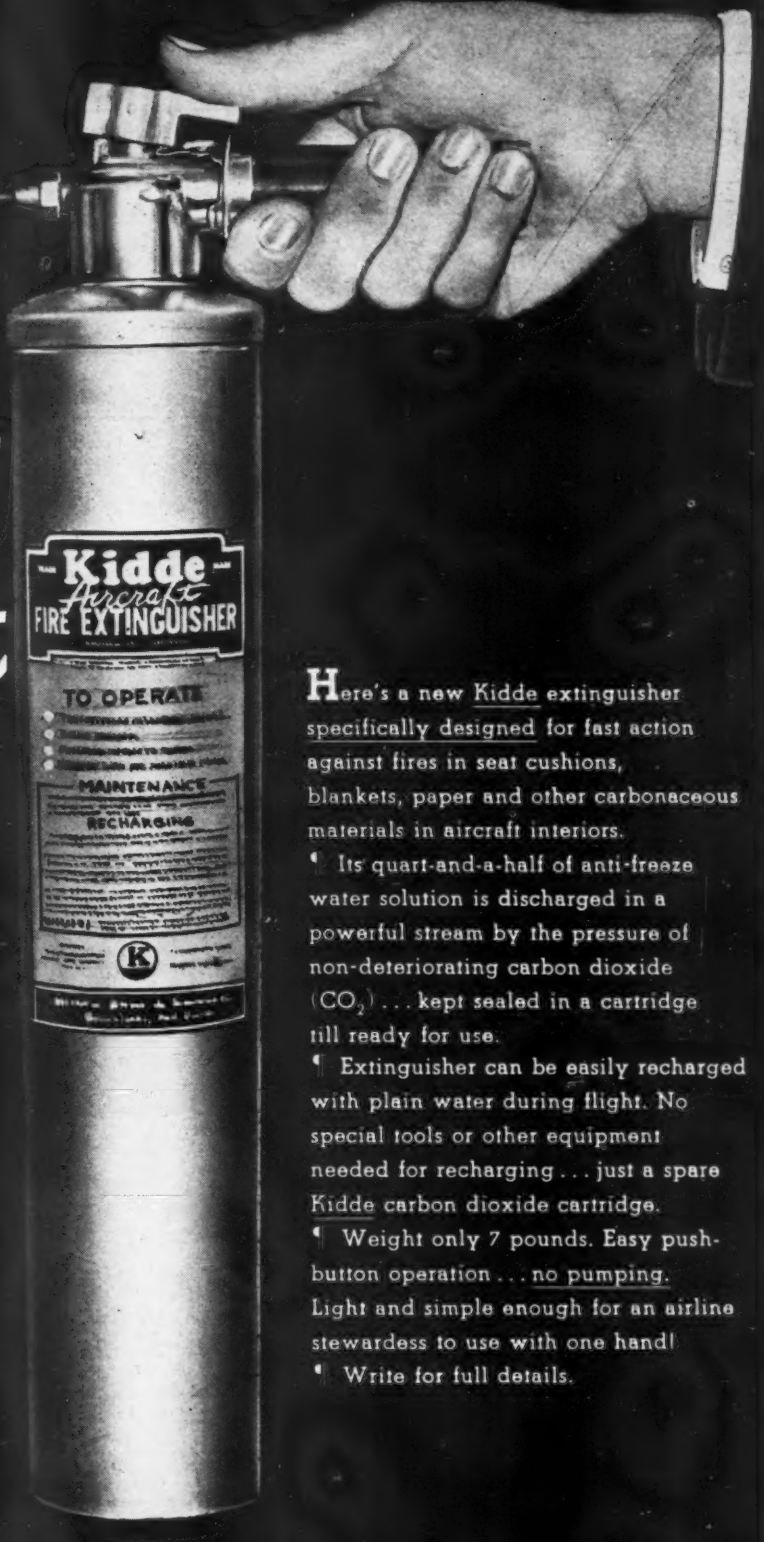

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¶ Its quart-and-a-half of anti-freeze water solution is discharged in a powerful stream by the pressure of non-deteriorating carbon dioxide (CO_2) . . . kept sealed in a cartridge till ready for use.

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¶ Write for full details.

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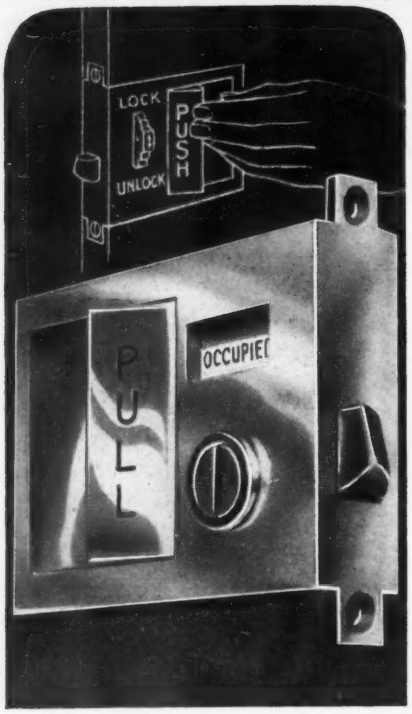

SELF-
Rivalry

Self-competition, constantly seeking better design and thriftier production, results in continuous advancement of product and purpose. Witness the Compartment Door Lock #AR20 shown above—more compact, lighter in weight, yet half the cost of its predecessor which we first created. Here is tangible evidence of why Adams Rite remains prime source for nearly all locks and latches used on large aircraft. Our independent approach to locking problems enabled us to foster the present trend toward standardization within the industry . . . today it's Adams Rite for nine out of ten!

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for Nearly a Half Century.

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AVIATION WEEK

Vol. 47 No. 5

INCORPORATING AVIATION AND AVIATION NEWS

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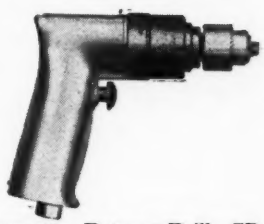

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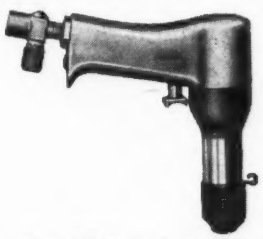

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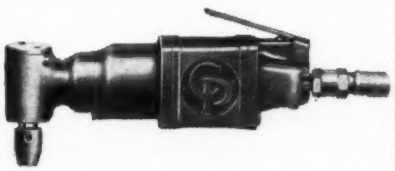
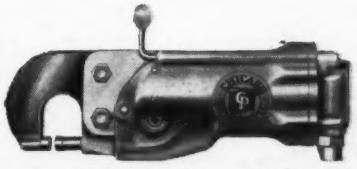


CP Pneumatic Impact Wrenches speed application of nuts and screws

CP-806 Universal Electric Drills . . . fast drilling up to 1/4"



CP-214 Compression Riveter for fast, accurate work in close quarters

For Every Aviation Job—

There's exactly the tool you need for any production job in Chicago Pneumatic Tool Company's unequaled line of Pneumatic, Universal Electric and Hicycle Electric tools . . . Riveters, Riveting-Dimpling Machines, Drills, Impact Wrenches, Screw Drivers, Nut Runners, Grinders and Sanders, Tappers, Planishing Irons, Safety Balancers. Write for further information.

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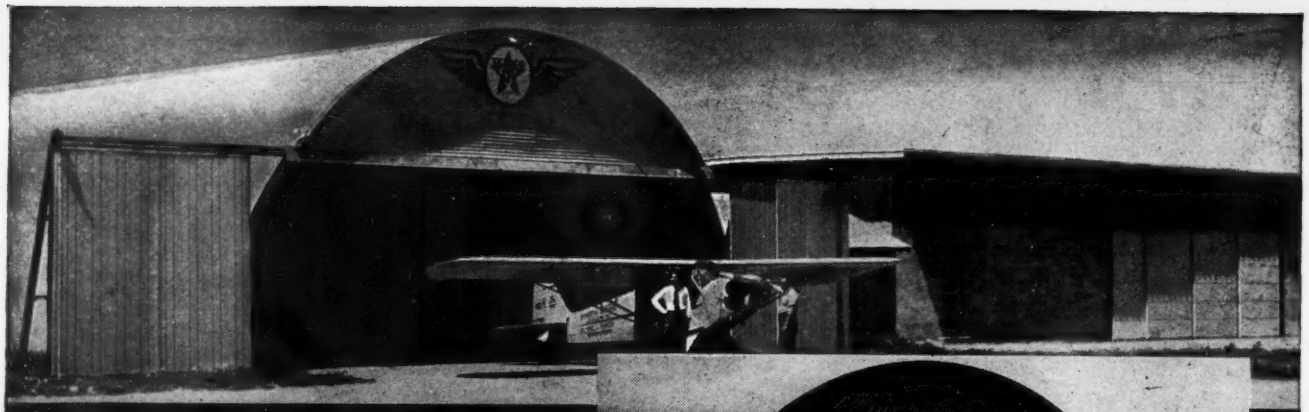
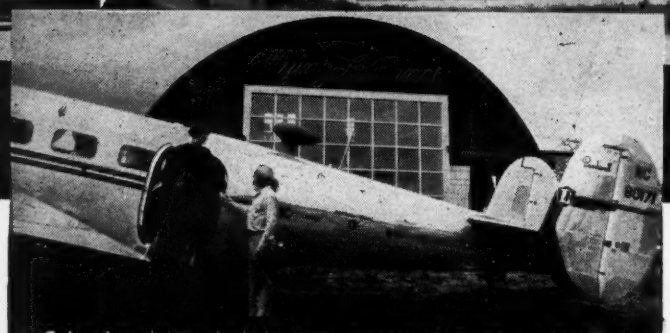
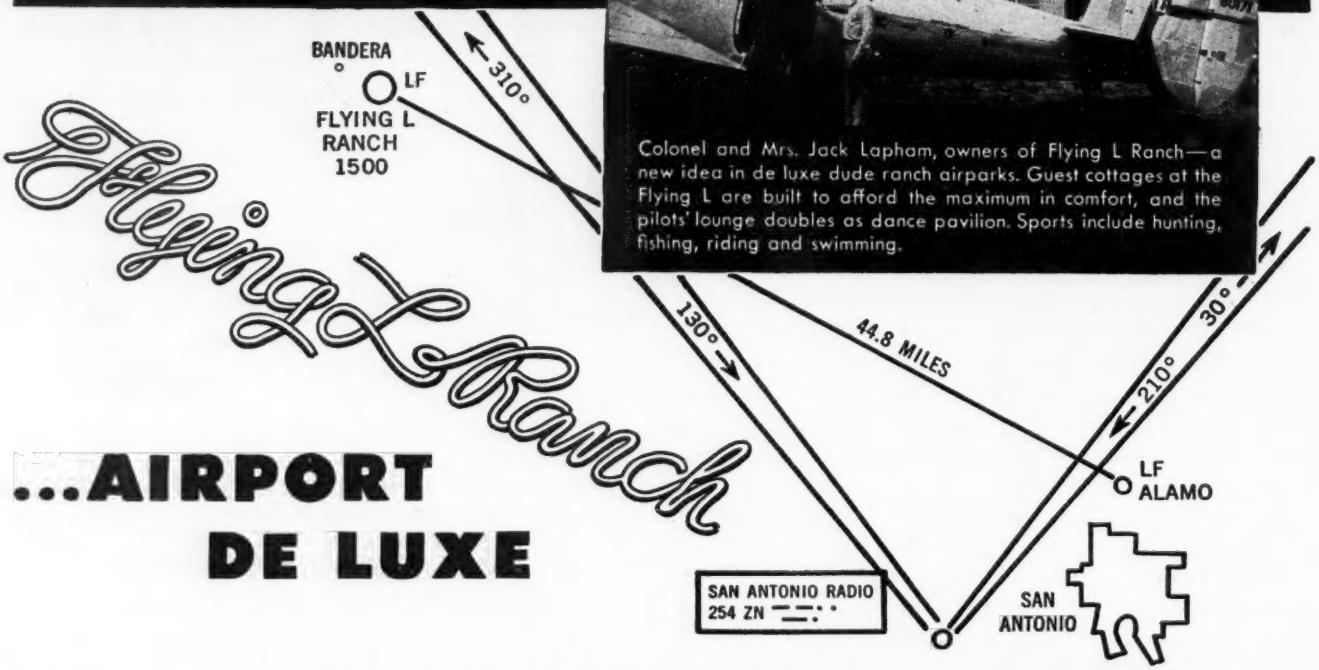


Flying L Ranch at Bandera, Texas, about 45 miles northwest of San Antonio, offers ample hangar space, fine runways, fully equipped repair shops and expert mechanics—the best in service and supplies for the discriminating flyer.



Colonel and Mrs. Jack Lapham, owners of Flying L Ranch—a new idea in de luxe dude ranch airparks. Guest cottages at the Flying L are built to afford the maximum in comfort, and the pilots' lounge doubles as dance pavilion. Sports include hunting, fishing, riding and swimming.



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Here's an airport really operated on the principle that the private flyer is entitled to smart, courteous attention . . . reliable service . . . and unquestioned quality of all products sold there. The Flying L sees that the flyer gets them all.

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THE AVIATION WEEK

PAUSE FOR BREATH—This is the breath-catching period after the adjournment of Congress. In the interval between adjournment and the time results of Congressional action will be plainly apparent, observers are carefully assessing just what is likely to come out of Congress' work. The broad outlines are there, the details fuzzy.

Overall, it seems Congressional action in the field of aviation was beneficial, more so than had been expected.

Military and Naval budgets were increased above original recommendations.

A bill for federal sponsorship and coordination of research passed.

The chosen instrument proposal for overseas airlines was killed.

A joint Congressional Committee to study air policy was authorized.

Perhaps most important was passage of the unification bill. After more than 20 years, the country finally has a separate air force, still under an overall Defense Secretary, but with greater freedom over its own affairs than ever before. Still to be defined are the exact implications of the establishment of a Department of Air Force. Freed from the sometimes confining grip of the War Department, the Air Force will have a host of new policies to formulate. They will emerge slowly.

SENATORIAL SIDESHOW—Despite the adjournment of Congress, interest still will center on Capitol Hill as that greatest of Senatorial sideshows—a full-blown, public investigation—seeks political gold in trying to determine who put the influence in Mr. Hughes' flying boat. Just what will result may have been foreshadowed last week by the remark of Subcommittee Chairman Homer Ferguson when witnesses could not give direct evidence of White House pressure. "Well," said the seeker-after-truth, "give us hearsay, then."

AIR POLICY—The study of this country's air policy is underway, although by mid-week, the ten-man Congressional group had not yet been appointed. The five-man Presidential Commission held its first full meeting, devoted to discussing organizational and staff matters, and then summoned a news conference. The chairman announced appointment of a counsel and spent the next 15 of the 20 minute conference in agilely ducking the question of the nature and extent of any cooperation with the congressional board.

INDUSTRY INCOME—Final approval of AAF and Naval appropriations is too new for the manufacturing industry to determine just what revenue it can expect from military and naval business out of the fiscal 1948 funds. But on the basis of the shipments for the five months through May, it looks to the manufacturers like a billion-dollar-year. This may mean a small overall industry profit. The calendar year 1948 still appears grim, unless supplemental appropriations are won.

Out of this year's appropriation increases, the major gain may be renewed military interest in transport planes, both those now a-building and on the drawing boards. This has far-reaching importance. AAF sponsorship of transport development would:

For the manufacturers, take up the slack caused by the reaching of the saturation point in airline sales.

For the airlines, bring closer the development of a turboprop or turbojet transport.

CAB SLOW-DOWN—In their assessment of aviation developments at this point, observers see CAB's decision in the remaining four area route cases coming slowly and reluctantly. Board members are dissatisfied with their handiwork in the seven previous cases. Now they want more time to watch the development of short haul networks already established.

Work on safety and finances has consumed much of the time that could have been devoted to these route cases.

The extensive delay is giving rise to criticism from chambers of commerce, communities, and their representatives in Congress, who cry discrimination. Symptomatic was a recent development when an examiner recommended against a feeder applicant in the Arizona-New Mexico area because of small traffic potential. The report was condemned by a concurrent resolution of the Arizona Senate and House, and every Congressman from that section was requested to protest to CAB.

NEW WORRY FOR PERSONAL AVIATION—The dog days of August, bringing the desire to get away from the hot city streets, out where there's air, hold a special kind of phobia for the personal aviation industry. In epidemic-like proportions, grass roots air shows are advertising "thrills-chills-spills." Virginia, alone, reportedly will be the scene of 38 of these in the next two months.

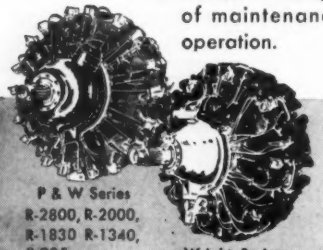
Already, the Personal Aircraft Council has felt it necessary to protest one such show.

To discourage just such exhibitions—catering to the sensational rather than the safe—the lightplane industry participated in the Aeronautical Show Council. But Council machinery apparently has broken down. Aviation wants shows selling the safety and utility of the personal plane. In increasing numbers it is getting shows demonstrating just how dangerous flying can be made, with an effort.

Aviation Activities Serves the Air Lines of the World!

No other public service demands the perfect performance which must be delivered by heavy-duty air transport engines . . . which means that *every part* which goes into these engines must be *perfect.* That's why you'll find the Aviation Activities emblem in the parts bins of the world's finest airlines . . . in the best maintenance service shops from Bombay to Boston . . . in private hangars from Los Angeles to London. Every part shipped by Aviation Activities is *new* and in perfect condition. Every part is subjected to meticulous examination by *CAA licensed inspectors.* Every part is treated for long-time storage, properly packaged and marked. One word explains this world-wide acceptance: RELIABILITY!

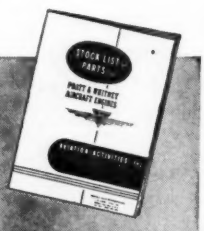
Aviation Activities, Inc., is staffed by men of long experience in commercial and military aviation . . . men who know world-wide air line regulations and standards. They are familiar with your problems of maintenance, overhaul, procurement and operation.



P & W Series R-2800, R-2000, R-1830 R-1340, R-985

Wright Series R-3350, GR-1820

Write or wire today for "Stock List of Parts," listing available parts. Specify whether for Wright engines, P & W engines, or both.



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NEWS DIGEST

DOMESTIC

John C. Cooper, former Pan-American Airways vice-president, has been appointed counsel to the newly-formed President's Air Policy Commission. Col. C. G. Williamson, formerly of the AAF, was named acting executive director, while continuing as an assistant to the Secretary of Commerce.

Glenn L. Martin Company's 40-passenger 202 has started its 16,000 mi. accelerated service flight test, its final CAA check before approval for airline service.

Air Cargo Inc. will establish a consolidated freight terminal for scheduled airlines in the Western Air Lines hangar at Los Angeles Airport.

CAA is looking for 200 single men for work as aircraft communicators in Alaska, at starting salaries of $3,306 a year.

Col. Albert Boyd, AAF, world speed record holder, as a result of his Lockheed P-80-R flight at 623.8 mph. has been decorated with the Distinguished Flying Cross by Gen. Carl Spaatz, AAF commanding general.

FINANCIAL

Consolidated Vultee Aircraft Corp. directors last week took no action on a common stock dividend for the quarter ending May 31, because of industry uncertainties. February and May payments of 25 cents each have been made to shareholders, who last year received four dividends of 50 cents each.

Exports by 11 personal aircraft manufacturers for the first six months of 1947, total $3,654,013 for 988 planes, as compared o $3,298,342 for the whole year 1946, when 1,383 planes were shipped. June exports were 174 planes, valued at $668,716, representing 15.3 percent of production and 16.7 percent of dollar value of production.

FOREIGN

Sir Arnold Overton has been appointed permanent secretary of the British Ministry of Civil Aviation.

First Percival Prentice trainer to be built at Hindustan Aircraft Factory at Bangalore, India, for the Indian Air Force is due for completion in January. After that date production will be on a five-a-month schedule.

RAF Squadron 617 composed of 16 four-engine Lincoln bombers, largest British operational planes, landed at Andrews Field, Md. last week to participate in Air Force Day exercises, and later to tour this country before returning to Britain.

President Enrique Jiminez of the Republic of Panama is opening the new $8,000,000 Panama City Airport to coincide with arrival of the first scheduled flight of Peruvian International Airways from Lima. Main runway is 7,500 ft. long and 200 ft. wide.

Focus attention on your product...

by prolonging its service life, increasing its efficiency and dependability, and reducing operating and maintenance costs. These advantages can be obtained

Through improved anti-friction performance...

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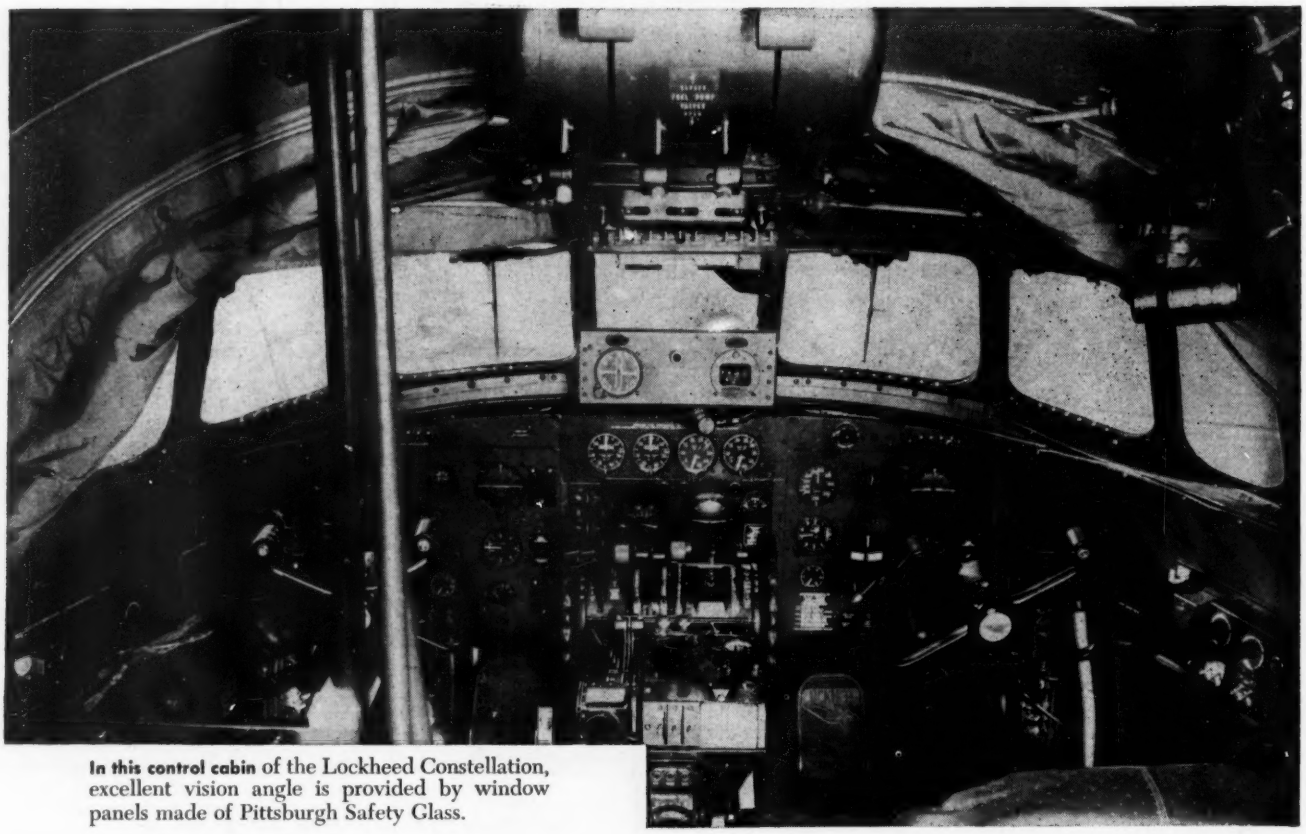
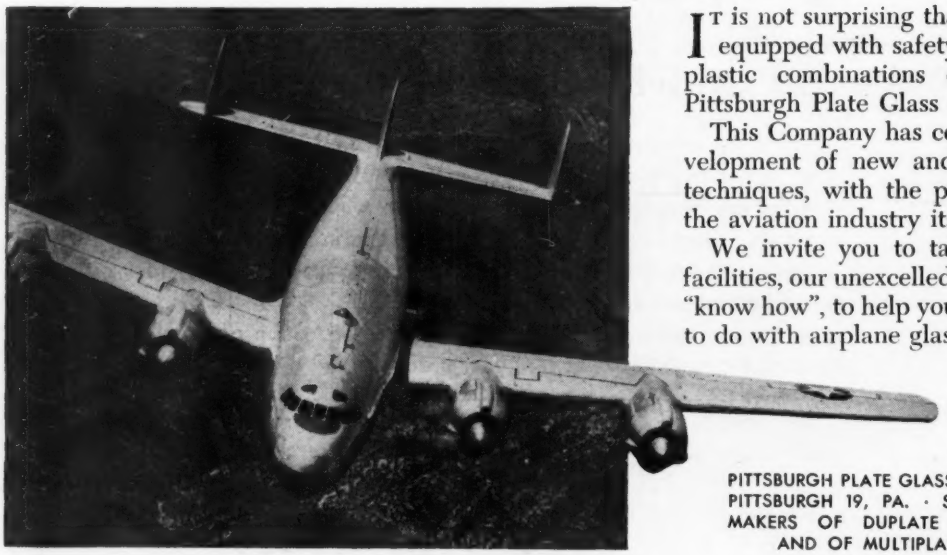
On the Lockheed Constellation

Safety Glass BY "PITTSBURGH"



In this control cabin of the Lockheed Constellation, excellent vision angle is provided by window panels made of Pittsburgh Safety Glass.



IT is not surprising that so many modern aircraft are equipped with safety glass, or plastic, or glass-and-plastic combinations developed and produced by Pittsburgh Plate Glass Company.

This Company has consistently kept pace, in its development of new and better products and glazing techniques, with the phenomenally swift progress of the aviation industry itself.

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PITTSBURGH PLATE GLASS COMPANY

VOL. 47 • NO. 5

AVIATION WEEK

AUGUST 4, 1947

INCORPORATING AVIATION AND AVIATION NEWS

Hughes Charges PAA-TWA Rivalry Stirred Senate Probe

Asks Senator Brewster to tell all on proposition at Mayflower Hotel lunch; confirms discussions with Juan Trippe.

TWA competition with Pan American Airways on Atlantic routes to Europe was blamed by Howard Hughes for stimulating Senate investigation of his wartime aircraft production contracts. In an open letter to Senator Owen Brewster (R., Me.) chairman of the Senate War Investigating Committee, published and copyrighted by the Los Angeles Examiner, Hughes urged Brewster to tell the "whole truth" about his activities.

"Why not tell that this investigation was really born on the day that TWA first flew the Atlantic? On the day when TWA first invaded Juan Trippe's territory—on the day when TWA first challenged the generally accepted theory that only Juan Trippe's great Pan American Airways had the sacred right to fly the Atlantic?

▶ **Mayflower Lunch**—"And why not tell about the day you invited me to lunch in your suite at the Mayflower Hotel (during the week of Feb. 10, 1947)?

(AVIATION NEWS reported in its Feb. 24 issue that Brewster was waging a one-man missionary campaign to enlist Hughes in his campaign for the community company. Brewster sponsored legislation to merge all American overseas airlines into a single all-American flag line.)

"And why not tell about the things you said to me and the proposition you put to me? And why not tell about my answer that I would have to think it over for 30 days and that I would let Mr. Trippe know at the end of that time?

▶ **Trippe's Flight**—"And why not tell about Mr. Trippe's flight to the Coast to see me and how Mr. Trippe and Mr. Dietrich (Noah Dietrich is executive vice-president of the Hughes Tool Co.) and I spent two days closeted in Palm Springs, Cal. (April 12 and 13.) And why not tell what we were talking about for two days?

(AVIATION NEWS in its March 3 issue reported that discussions were under way between Pan American officials and Howard Hughes on possibilities of merging the two airlines with a view toward providing Pan American with domestic routes and easing TWA's financial difficulties. Both Hughes and Pan American officials denied the discussions at that time.)

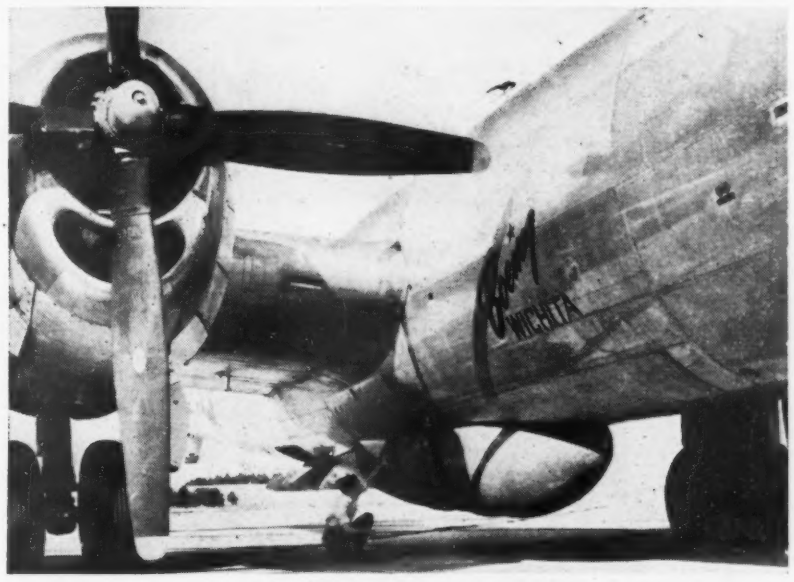
Hughes also claimed the government had accepted formally all but one of the airplanes called for in the contracts under investigation by the Senate committee. He said the AAF has accepted two of three F-11 photo reconnaissance planes called for in a $13,000,000 contract and a third F-11 is now undergoing flight acceptance tests. Hughes declared the Government formally accepted delivery of his flying boat at his Culver City plant last February and that since that time he has invested $7,000,000 to ready the boat for flight tests. Hughes maintains that he has been in the aircraft business for 14 years and has lost $13,000,000 on this activity.

▶ **Kaiser's Charges**—Henry Kaiser, West Coast industrialist, who was associated with Hughes in the early stages of the flying boat contract, charged in his appearance before the Senate hearing that his plan for a mass production of a huge fleet of cargo planes to foil Nazi submarine warfare got a "clever, mysterious, kiss-off" by "those in power" and his second proposal for a fleet of small aircraft carriers was approved only after a Navy committee had voted 16 to 0 to reject his plan.

Kaiser said the Navy was magnanimous enough to concede they were wrong after escort carriers proved decisive in anti-submarine warfare in the Atlantic. Kaiser charged that the same forces that torpedoed his cargo plane fleet are still at work to leave us with a weak air force.

Kaiser also said that a committee of aircraft manufacturers including Tom Girdler, Jack Northrop, Glenn L. Martin and Donald Douglas with Grover Loening, then a War Production Board consultant, studied his plans thoroughly and recommended that greater emphasis be placed on cargo planes and then suddenly switched its position in a meeting in Donald Douglas's office in Los Angeles in August, 1942, which put the final quietus on Kaiser's plans for mass producing cargo planes.

Kaiser said that after this rebuff he turned to Howard Hughes to do a research and development job of designing large aircraft



TWENTY ONE TONNER

Closeup shows 42,000-lb. bomb, largest ever built, fitted to modified Boeing B-29. This one contains no warhead and will be used (AVIATION WEEK, July 15) for ballistics tests in bombsight correlation. (Press Ass'n photo)

and to the Reconstruction Finance Corp. for funds to finance the job. He said Hughes insisted his role be confined to research and development and that if the cargo plane deal evolved into mass production that Kaiser handle it.

Grover Loening replied to Kaiser's implication that there was a double-cross in the cargo plane deal by charging that Kaiser double-crossed him by originally saying the planes would be built in existing shipyard facilities and then planning to erect a new aircraft plant to build them. It was the Kaiser proposal to build a new plant that soured him on the cargo plane deal, Loening explained.

A long parade of witnesses including Hughes, AAF and Navy officers and wartime production officials are scheduled to be heard by the Senate committee which is attempting to determine whether political influence was used in award of the contracts to Hughes.

All-Weather Birthday

AAF All-Weather Airline completed its first year of operation August 1 and reported only two uncompleted flights, both of which were due to causes other than weather. AAFAWA is the only completely radar equipped airline in the world. Operating between Wilmington, Ohio and Andrews Field, Maryland, the airline uses either actual or simulated instrument conditions from takeoff to landing of each flight.

New U. S. Air Force Studying Organization

Officials of the former War and Navy Departments and Army Air Forces last week were studying the mountain of problems created by enactment of the law unifying the three services into a National Security Organization.

The changes that will have to be made, considerable in each service, are likely to be most sweeping in what formerly was the AAF. Only thing certain is contained in the statement of the new Secretary of National Security, James V. Forrestal, that "this is an evolution, not a revolution."

In effect, the law creates the separate air force which aviation has advocated for more than 20 years. The Department of the Air Force is headed by its own Secretary. Although under the jurisdiction of the Secretary of National Security, the Air Force Department seemingly will have full and free control over its own policies. The annual budget will pass through the Secretary of National Security, but the Air Force Secretary will still be free to present to the President any budget recommendation he sees fit—a privilege that has not belonged to the Assistant Secretary of War for Air.

► **Fifth Star for Spaatz?**—Under the Department of Air Force is the United States Air Force, headed by a Chief of Staff, USAF. He will hold the same rank as provided by law for the Chief of Staff, U. S. Army and for the Chief of Naval Operations—which might mean a fifth star for Gen. Carl Spaatz, present commander of the Air Force.

Who will fill the two top jobs in the USAF still is to be decided, although logically Former Assistant Secretary of War for Air W. Stuart Symington and Gen. Spaatz will merely move up a notch.

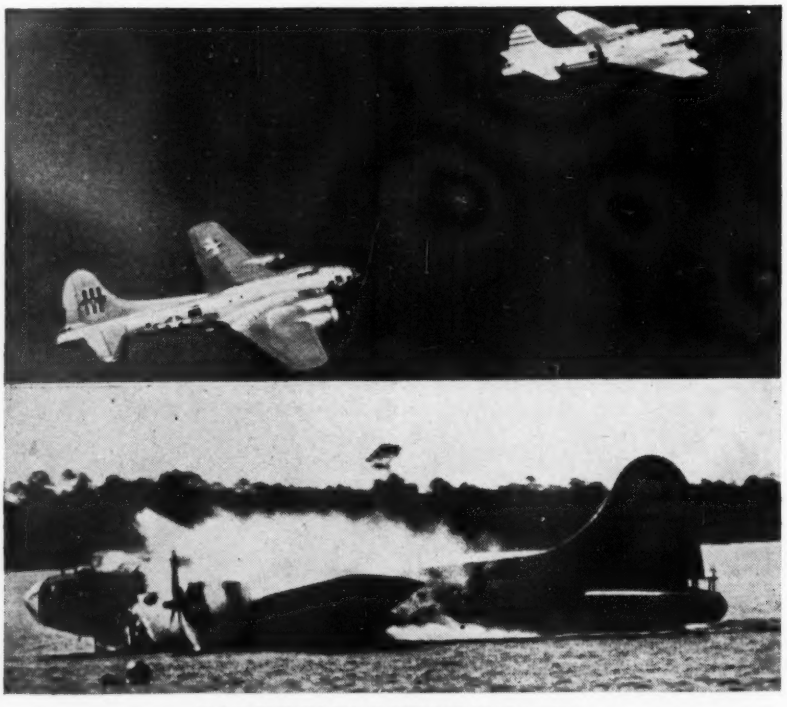
Answers to other riddles propounded by the unification are not as easily assumed. Divorce from the War Department leaves the new USAF without a quartermaster corps. It also slices away part of the medical facilities formerly available. There will be the need of greatly expanded headquarters.

It is likely the USAF will have a new uniform, eventually, and new designations, such as Airman, perhaps sooner.

► **New Freedom**—In the long run, the principal effect of unification on the aircraft industry may be in procurement procedures. Under the former set-up, the Undersecretary of War, not the Assistant Secretary for Air, was responsible for procurement policies and regulations. In this the USAF will now be independent.

There will probably be little actual change in the functions of the Army-Navy Munitions Board and its relationship to industry, although the act would imply a major change. The functions, records and personnel of the ANMB will be transferred to the Munitions Board, which is part of the National Security Organization. There will be a separate National Security Resources Board. Work that has been handled by ANMB will now be done by both, with the distinction that the Resources Board is to be a civilian agency, working in purely civilian spheres.

However, it has long been assumed by ANMB officials that when unification was accomplished, they would be in the driver's seat. ANMB has been formulating the plans and organizational structure of the new Resources Board. So on industrial preparedness, procurement coordination and the like, industry apparently will be dealing with the same people at a different stand.



B-17 DRONE GETS DITCHED

First of ten Boeing B-17 drones modified by Curtiss Wright Columbus plant is deliberately ditched as part of extensive AAF research program aimed at designing greater safety in future craft. Top photo shows heavily-instrumented drone (right) being guided toward water by mother plane and bottom photo shows drone at moment of impact. Standby crews immediately move in to remove recording instruments—including television—in water-tight containers. (Press Ass'n photo)

Air Race Entries

Race entries for the 1947 National Air Races at Cleveland Municipal Airport, Aug. 30, 31 and Sept. 1, close today (Aug. 4), Ben T. Franklin, general manager, has announced.

Events scheduled:

Sat., Aug. 30—Bendix Transcontinental Races, reciprocating and service jet division; Women's Trophy Race; Goodyear Trophy Race, preliminary heats for midget race planes; Kendall Trophy Race for North American P-51s.

Sun., Aug. 31—Weatherhead Jet Trophy dashes; Goodyear Trophy semifinals; Sohio Trophy Race for Lockheed P-38s.

Mon., Sept. 1—Thompson Trophy races, reciprocating and service jet divisions; Tinnerman Trophy Race for Bell P-63s; Goodyear Trophy Race finals.

Carriers Intensify Battle for Freight

Certificated, uncertificated lines see the other holding unfair advantages.

Initial sparring in a new CAB-approved battle for the lion's share of U. S. airfreight tonnage is underway between the certificated airlines and uncertificated all-cargo operators now acquiring common carrier privileges. With both sides already protesting that the other is using unfair tactics, the fight promises to be bitter.

The Air Freight Forwarder Association, backed by the Detroit Board of Commerce, has asked CAB to suspend the certificated carriers' new airfreight tariff, which was to go into effect last week with provisions for a 25 percent rate reduction. Both AFFA members and uncertificated carriers are concerned over the potentialities of Air Cargo, Inc., the regular airlines' ground service organization, and they hint at anti-trust action. The certificated airlines, on the other hand, are protesting that CAA and CAB intend to give their competitors a substantial advantage by permitting them to operate under less stringent safety regulations.

▶ **More Planes for Slick**—Meanwhile, Slick Airways, largest uncertificated airfreight operator, marked its shift from a contract carrier to a scheduled common carrier Aug. 1 by moving to increase its fleet 50 percent. Slick purchased five more C-46s of the F and D types from War Assets Administration, thus bringing its number of Commandos to 15. The carrier intends to do its own conversion job on the planes.

Globe Freight Airline, Hartford, Conn., last month became the first uncertificated all-cargo line to receive a letter of registration from CAB under Section 292.5 of the Economic Regulations, effective last June. Globe will be permitted to operate as a scheduled common carrier until its pending application for a route certificate has been ruled on by the Board.

▶ **Points Listed**—Active with C-47s on a contract basis for more than a year, Globe has been authorized to fly between Boston, Hartford, New York, Philadelphia, Baltimore, Richmond, Charlotte, Atlanta, Birmingham, Ala., and New Orleans. The carrier's tariff was filed last week.

Sixteen carriers have filed for interim common carrier privileges under Section 292.5, and the Air Transport Association reportedly believes that at least five and possibly eight of the applicants are qualified. Besides Slick and Globe, ATA expects Air Borne Cargo Lines, Air Cargo Transport Corp., and California Eastern Airways to receive letters of registration. In the doubtful class it lists Willis Air Service, U. S. Airlines and Mutual Aviation.

▶ **New Applications**—Carriers which ATA analysts believe do not meet requirements for letters of registration under 292.5 despite their applications are Santa Fe Skyway, Monongahela Valley Airways, Latin American Cargo, Airnews, Inc., California Growers Air Express and Flamingo Air Service. Latest two applications for common carrier cargo privileges under 292.5 have come from Trans-Air Hawaii, Ltd., Honolulu, and Bekins Van Lines Co., Los Angeles.

The Air Freight Forwarder Association has charged that the effect of the new cargo rate tariff filed last month by 19 certificated airlines is to deprive indirect carriers of their major source of income—a reduced rate for consolidation of less than planeload shipments into planeload lots. In its petition for suspension, AFFA declared the scheduled airlines' tariff violates well-established principles for the benefit and protection of shippers and forwarders alike and is "unjust, preferential and discriminatory."

▶ **Same Rate Charged**—Under the tariff, AFFA said, the same rate per 100 lb. will be assessed the shipping public for dispatching 15,999 lb. as will be charged for 100 lb. "This ignores long-recognized transportation economics which show it costs relatively less to handle volume shipments than smaller lots."

Replying to the freight forwarders, American Airlines said this "probably is the first time in transportation history that a tariff charging the same rate of all shippers of less than carload (or planeload) quantities has been questioned as discriminatory."

▶ **Illegal Operations Seen**—Nub of the forwarders' petition asking suspension of the new tariff, American continued, is that the setup is designed to prevent indirect carriers from profitably using the service of the certificated airlines.

Charging that the forwarders are "outlaws," American said CAB had already conducted a hearing and investigation, after which it ruled that indirect carriers may not engage in air transportation without a certificate of public convenience and necessity. "All of the 23 members of AFFA are violating the Civil Aeronautics Act since none of them holds a certificate," American declared.

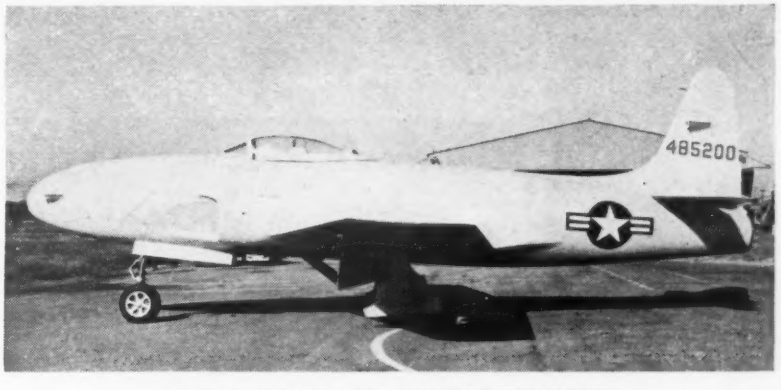
▶ **Safety Regulations Eyed**—ATA believes that all-cargo operators engaged in scheduled common carrier activity under 292.5 should be subject to safety provisions of parts 40 and 61 of the Civil Air Regulations as are the certificated airlines. It has found, however, that CAA has no intention of applying these regulations but instead has taken steps to permit the all-cargo carriers to continue operating under the less stringent provisions of part 42 of the Civil Air Regulations governing nonscheduled lines.

CAA and CAB have doubts whether any airfreight operators are at present prepared to meet the safety requirements of parts 40 and 61. CAB's safety rules division has submitted to the board a proposal that a special Civil Air Regulation be enacted permitting all-cargo lines qualified to operate as common carriers under 292.5 to continue flying under part 42 until their applications for a certificate have been ruled upon.

Aerial Patrol

The Michigan Department of Aeronautics, with the cooperation of the State Police, has started an aerial police patrol to curb reckless flying. The action results from the death of 23 persons in 99 aircraft accidents in Michigan during the first six months of this year. A total of 198 complaints has been handled by state police.

The week-end patrol includes a Stinson 150 and a North American AT-6 owned by the Department with a third plane to be added shortly. The unscheduled patrols attempt to spot low-flying aircraft and follow them to their base, where the pilots are questioned for prosecution.



NEW WING OF SPEEDBREAKER

Closeup of 623.8-mph. Lockheed P-80R special racing Shooting Star reveals flatter, deeper air intake; smaller, more streamlined canopy; sealed nose gun ports and racing wing. New wing has increased chord, creating lower thickness ratio, sharp leading edge and improved root fairings. Wing and fuselage skin is of special smooth construction by hand straightening, surface milling and polishing. Plane is original XP-80B modified for record attempts in 1945.

New York Airport Problem Clearing

Newark lease submitted and Floyd Bennett due to open soon.

Most of New York City's major airport problems apparently are headed for solution, at long last marking a definite turning point in plans started back in 1944.

Major reasons for the optimism:

• Fact that, after months of negotiations, a majority of Newark's City Commissioners are "disposed" to accept the Port of New York Authority's last offer—giving Newark the big end of a 75-25 split of net revenues throughout a 50-yr. lease on its airport and seaport.

• Opening Floyd Bennett Field in Brooklyn to commercial traffic this month, target date depending solely on how fast leases and other arrangements can be completed with the Navy—to relieve overloaded LaGuardia Field.

The Port Authority's proposed lease has been before Newark officials for awhile, but much remains to be done before it is signed. All five members of the city commission will study the lease, then get together for a special meeting. Approval will then be given in a proposed city ordinance, expected to be passed on its first reading, following a public hearing to be held about mid-September. Mayor Vincent J. Murphy and Commissioners John B. Keenan and Ralph A. Villani are expected to vote for the agreement with Commissioners Meyer C. Ellenstein and John A. Brady voting against it.

► **Genesis of Plan**—With Newark in the fold, the metropolitan New York area's major airport phase of an overall plan moves a long step toward operation. This plan was first initiated back in 1944 when the Regional Plan Association, Inc., at CAA request, sponsored organization of the Regional Airport Conference to make a study which could be integrated with CAA's nationwide airport aid program. Last December this plan was approved by CAA as a basis for development of metropolitan area needs.

The Conference's plan proposes:

• Improvement and continuous operation of existing single runways at LaGuardia; expansion of Newark as a dual runway port; opening Idlewild and developing it as a dual runway port. Following these developments it proposes a fourth major port in the North Jersey meadows opposite midtown Manhattan to handle anticipated traffic after 1855 unless Idlewild can be expanded to twelve runways.

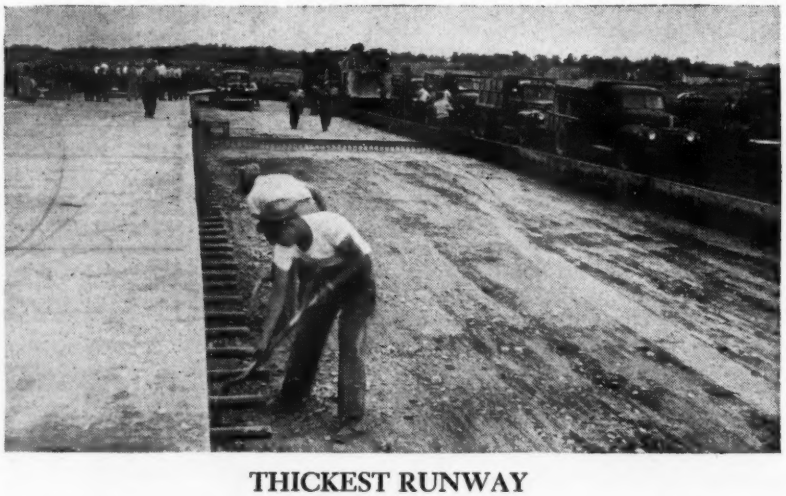
• Eight supplementary ports to relieve major port peak loads and facilitate trunkline passenger movement. Some of these may eventually become feederline ports.

• Eighteen secondary and 99 local ports—of which 72 of the latter are still nonexistent—to handle personal planes.

Full implementation of this plan will require, according to the Regional Plan Association, adding Connecticut to the New York-New Jersey cooperative orbit so that a single tri-state agency can be set up.

► **Interim Steps**—Meanwhile, the Port Authority was moving forward with considerable speed, marked by appointment of Hervey H. Law as Director of Airports (see Aviation Week, July 14, p. 66); William H. Schwarz as Chief, Scheduled Air Transport Director, Port Development; and George M. McSherry as Assistant Superintendent at LaGuardia.

Imminent use of Floyd Bennett will permit transferring to it all nonscheduled and international flights, relieving LaGuardia of some 250 flights per day so that engineers could go ahead with plans to arrest the rather fast settling into Flushing Bay of the east end of LaGuardia field.



THICKEST RUNWAY

Photo of the new very heavy bomber runway under construction at Patterson Field, Ohio, shows thickness of the sturdy runway and heavy steel dowel bars which transfer the load between separate 25 ft. lanes. Concrete is poured in thicknesses of 21 to 25 inches. When completed in December, the job will provide a 300 ft. wide 8,000 ft. long pavement, with additional 1,000 ft. clear zone at either end, making an overall length of 10,000 ft. Contraction joints every 28 ft. use strips of asphalt and rubber, together with Paraplastic, newly developed compound. Wearing surface is protected by chemicals added during the mixing process, which prevent deterioration from calcium chloride or other de-icing compounds.

Aircraft Industry Income Is Rising

Aircraft industry's income, from commercial shipments or payments on military work, continued to rise during May to a monthly high for the year of $62,970,218, according to figures compiled by the Bureau of the Census. This is in addition to shipments by or payments to engine manufacturers in the month totaling $31,116,497.

Aircraft producers' total income for May was up about 7 percent from the April figure of $58,505,836, while engine manufacturing income rose about 4 percent from $29,722,179. Value of shipments, plus payments on military work, from January through May for aircraft, engines, and other products total $425,769,475.

► **Values Higher**—While the value of shipments and payments in May was more than in April, number of aircraft shipped was lower—2,143 in April compared with 1,740 in May. Military planes dropped from 105 to 94; two-place from 964 to 847; three- and four-place from 1,042 to 771; and five and more from 32 to 28.

United Will Add 200 Radar Altimeters to Fleet

United Airlines has purchased 200 RCA APN-1A radar altimeters and expects to have them installed in its entire fleet of mainliners by this winter. The units are manufactured new by RCA. Terrain clearance is indicated in the cockpit by warning lights and a needle.

Three instrument panel lights are used: green, to indicate that the airplane is above the preset minimum altitude; amber, to indicate the airplane is approaching the minimum altitude, and red, to indicate the airplane is at or below the minimum altitude. In addition to these lights, an indicator needle provides a continuous reading of the terrain contour below the airplane.

Range of the device is 8,000 ft. below and ahead of the plane. Weight of the entire equipment, including transmitter, receiver, indicator, warning lights and antenna, is only 30 lb. The system may be set at any predetermined altitude up to its maximum range of 8,000 ft. A valuable use of the instrument is seen in its application to automatic airport approaches, during which it may be set for 100 or 200 ft., relieving the pilot of the necessity for constant reference to the standard altimeter.

AVIATION CALENDAR

Aug. 7-8—Annual summer meeting, Institute of the Aeronautical Sciences, Los Angeles.
Aug. 7-8—1947 convention, National Flying Farmers Association, Oklahoma A & M College, Stillwater, Okla.
Aug. 11—International Air Transport Association, tariffs and schedules subcommittee, Paris.
Aug. 13 — CAA-sponsored State Aviation Forum, Nashville, Tenn.
Aug. 16 — ISAO communications working committee, Mexico.
Aug. 16-17—Oakland Air Show, 20th anniversary of Dole flight, sponsored by Junior Chamber of Commerce, Oakland, Cal.
Aug. 19—International Air Transport Association, financial committees, Paris.
Aug. 21-22—West Coast transportation and maintenance meeting, Society of Automotive Engineers, Biltmore Hotel, Los Angeles.
Aug. 25—International Air Transport Association, financial-accountancy and statistical subcommittee, Paris.
Aug. 28—International Air Transport Association, financial-clearing house subcommittee, Paris.
Aug. 30-Sept. 1—National Air Races, Cleveland, Ohio.
Sept. 1-4—Fall meeting American Society of Mechanical Engineers, Salt Lake City.
Sept. 1-10 — International Air Transport Association technical conference, Nice.
Sept. 3.—International Air Transport Association, financial committee, Brussels.
Sept. 6—Anglo-American conference, Institute of the Aeronautical Sciences and Royal Aeronautical Society, London.
Sept. 8-12—Second annual conference and exhibit, Instrument Society of America, Hotel Stevens, Chicago.
Sept. 15-17—Air Force Association, first annual convention, Columbus, Ohio.
Sept. 16—ICAO rules of the air and air traffic control meeting, Montreal.
Sept. 16—International Air Transport Association, technical committee, Nice.
Sept. 16-18—Second Regional CAA conference, Atlanta.
Sept. 17 — ICAO meteoroligical division, Montreal.
Sept. 23—ICAO aerodromes, air routes and ground aids division, Montreal.
Oct. 2-4—Autum aeronautics meeting, Society of Automotive Engineers, Biltmore Hotel, Los Angeles.
Oct. 3-4—Arizona State Aviation Conference, Douglas, Ariz.
Oct. 6—International Air Transport Association, executive committee, Rio De Janeiro.
Oct. 7—International Air Transport Association, traffic committee, Rio De Janeiro.
Oct. 14—International Air Transport Association, third annual general meeting, Petropolis.
Oct. 15-18—Montreal Board of Trade, second annual air conference, Montreal.
Oct. 20—International Air Transport Association, executive committee, Petropolis.
Oct. 20—Air Industries and Transport Association of Canada, annual meeting, Gray Rocks Inn, St. Jovite, Quebec.
Oct. 20—ICAO meeting on multilateral agreement on commercial rights, Petropolis.
Oct. 24-26—"Air Day in Texas" aviation show, Harlingen, Texas.
Oct. 26-28—National Association of State Aviation Officials, Fort Worth, Texas.
Nov. 4-7—National Airport Show and Institute, sponsored by Air Foundation and National Aeronautic Association, Municipal Auditorium, Cleveland.
Nov. 6-7—Fuels and lubricants meeting Society of Automotive Engineers, Hotel Mayo, Tulsa, Okla.
Nov. 18—ICAO search and rescue division, Montreal.
Nov. 19-22—Fifth Annual National Aviation Clinic, Springfield, Ill.
Dec. 1-3—Air transport meeting, Society of Automotive Engineers, Hotel Continental, Kansas City.
Dec. 1-5—68th annual meeting, American Society of Mechanical Engineers, Atlantic City.

Industry Observer

► **Watch for a Navy attempt to smash the AAF world speed record with its Douglas-built Skystreak. The Navy record attempt will be made at Muroc sometime during August depending on weather conditions. Navy originally planned to beat the Lockheed P-80R record of 623.8 mph. with the McDonnell F2D, twin-jet Banshee but now feels the Skystreak (D-558) will crack the recork by a wider margin.**

► Air Transport Association is experimenting with a cockpit loudspeaker to replace earphones for pilots of commercial transports. Initial flight tests indicate a speaker arrangement can be made satisfactory for routine operations and materially reduces pilot fatigue caused by earphones.

► **CAA will require replacement of all DC-4 outboard elevator hinge bolts by Oct. 15. These are the bolts that figured prominently in investigatio nof empennage failure in Eastern Airlines crash at Port Deposit, Md. New bolts will be thicker and stronger. Other airlines including Pan American and Northwest have reported hinge bolt trouble since the Eastern crash.**

► Watch for a big batch of new AAF contracts for military transports of all types including the Boeing C-97, Douglas C-74, Northrop Pioneer and possibly the Lockheed Constitution.

► **Douglas has a new AAF contract for $5,703,667 to relieve a critical shortage of spare parts for the C-47 and C-54. About 70 percent of the contract will be devoted to C-54 parts. Douglas will also do extensive modifications on the C-74 for the AAF after the switch to 3,500 hp Pratt & Whitney engines is completed.**

► Boeing Stratocruisers on order for Scandinavian Airlines System are being designed for a maximum of 35 passengers to provide a super-luxury service. Basic Stratocruiser design calls for 80 passengers.

► **Vickers-Armstrong has completed design of a six engine jet bomber. Prototype is scheduled to fly in 1951. Martin six jet bomber flew last spring with Boeing's six jet model scheduled to fly before fall.**

► Bristol Aircraft is building a twin-engine 10 passenger helicopter similar in general arrangement to the Piasecki. Engines are 550 hp driving rotors fore and aft.

► **Russian Lavatochkin turbojet fighter is comparable in technical development to the Bell P-59. It is powered by two German built BMW 003A axial flow turbojets mounted side by side in the belly with a single air intake in the nose. Speed is below 600 mph.**

► Sperry has developed a supersonic reflectoscope that reveals flaws in aircraft materials by transmitting supersonic sound waves through the material. Since different materials transmit sound waves at speeds varying with their density, the reflectoscope is capable of detecting variations in chemical content and homogenity.

► **Avro's Tudor VIII powered by four Rolls Royce Nene turbojet engines is scheduled to fly in September. The new plane is scheduled to carry 40-60 passengers. New Nene will develop 6,000 lb. static thrust.**

► Navy is investigating magnesium and aluminum as rocket fuels due to their extremely high combustion heat and large density. The metals are used in powdered form suspended in a hydrocarbon base.

► **Vickers claims 178 orders for its Viking transport with British European Airways scheduled to receive 108. All orders are within the Empire with the exception of 20 ordered by the Argentine government and 7 by Aer Lingus of Ireland. RAF Transport Command will take an unspecified number of additional Vikings.**

► Cessna Aircraft reports no failure of its chrome vanadium spring steel landing gear on 6,000 model 120s and 140s delivered to date. The gear weighs only 125 lb.

► **Boeing is running test flights in its YL-15 Army ground force liaison plane at Wichita. Early tests indicate extreme maneuverability.**

GAPA Shifted

Boeing Aircraft Co. has moved its test-firing operations of the GAPA guided missile from Wendover Field, Utah, to Alamagordo, N. Mex., the main AAF guided missiles proving ground. A total of 39 GAPAs were fired at Wendover before the transfer. At the new site, from five to eight test missiles will be fired each month, according to Richard H. Nelson, Boeing project engineer.

New Electronic Flight Trainer Soon Ready for Delivery to PAA

Curtiss-Wright mockup of Boeing 377 to broaden scope of transition courses and reduce "in-flight" instruction required to reach a given degree of proficiency.

Designed to save approximately $3,000 and 10 hr. transitional flight time per crew, an electronic flight trainer ordered by Pan American World Airways, from Curtiss-Wright's Electronic Trainer Dept., Caldwell, N. J., now is nearing completion.

Purpose of the device, designed by Dr. R. C. Dehmel, Electronic Dept.'s chief engineer, is to train airline pilots, copilots, and flight engineers in operational use of all controls and instruments of the Boeing 377 Stratocruiser during normal flight, simulated maneuvers, instrument approaches, and emergency procedures. Full instrumentation is used, permitting a complete course of flying. Value of the trainer is predicated on its ability to duplicate actual aircraft performance and radio avigation, enabling the flight training section to reduce flight time.

A more comprehensive course will result because of the great variety of equipment-malfunctioning the trainer can simulate. Practice is given in dealing with faulty operation such as runaway propellers, cracked manifolds, turbosupercharger ailments, engine fires, and disturbances of electrical system—all of which are impracticable to demonstrate in actual flight.

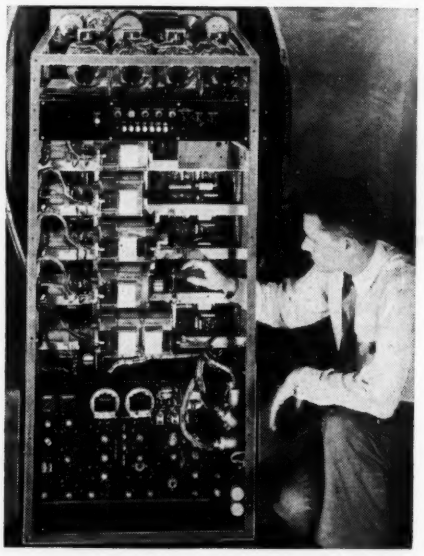
The unit will serve to increase efficiency of crews forced to work under adverse conditions, and will lower flight time requirements during the training period.

► **Exclusive Features**—The trainer is the only one employing electronics for computation of flight characteristics, and is entirely electrical instead of pneumatic. Any aerobatic maneuver can be performed because instruments are actuated without necessity of turning or banking the fuselage.

"Contour potentiometers" translate operation of throttle, rudder, elevator, and other controls into instrument readings which are indicated on the panel as airspeed, rate f climb and turn, pitch and roll, etc. Readings are computed almost instantly, giving indications the pilot needs quickly and accurately —as though he were actually in flight.

► **Noise Reproduction**—Variable engine noises in flight are reproduced—particularly valuable in trainers simulating multiengine flights where synchronization is necessary.

All trainer components are readily accessible. Servicing is facilitated by use of electronic circuits familiar to any competent radioman. Servo motor units are similar to those used on wartime antiaircraft gun directors and bombsights.



TYPICAL SERVO MECHANISM installation in Dehmel-designed flight trainer under construction by Curtiss-Wright for near-future delivery to Pan American.

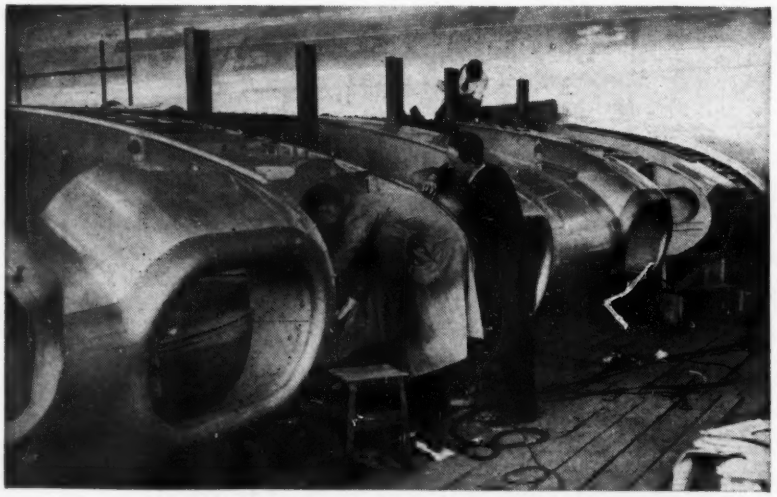
Typical savings to be realized—figuring a nominal cost per hour for both trainer and aircraft time, may be estimated as follows (basing example on class of 50 captains and 50 copilots; figuring aircraft time at $300 per hr. and trainer time at $30 per hr.):

Conventional Transition Course

Captain	12 hr. × $300 × 50 =	$180,000
Copilot	9 hr. × $300 × 50 =	135,000
	Total =	$315,000

Course with Dehmel Trainer

Captain	10 hr. × $ 30 × 50 =	$ 1,500
Copilot	10 hr. × $ 30 × 50 =	1,500
Captain	7 hr. × $300 × 50 =	105,000
Copilot	4 hr. × $300 × 50 =	60,000
	Total =	$168,000
	Saving =	$147,000



BRABIZON I ENGINE NACELLES

Size of Britain's 279,000-lb. gross wt. Bristol Brabizon I is shown here as workmen put finishing touches on propeller housings and engine nacelles of right wing. Prototype will be powered by eight 2,500-hp. Bristol Centaurus piston engines grouped in pairs to drive four props, while later model will be powered by Bristol Theseus turboprops. (British Combine photo)

Engine Production

Melbourne (*McGraw-Hill World News*)—The Lidcombe Aircraft Engine Factory of the Commonwealth Aircraft Corp. recently delivered its 870th Twin-Row Pratt & Whitney Wasp engine to the Royal Australian Air Force. The average cost, including depreciation and amortization, was £7,800 ($25,700).

The Fishermen's Bend factory of the Government-owned CAC. has produced 680 single-row P&W Wasp engines at an average cost of £4,000 ($13,200.) The Lidcombe plant is now working on an order for 108 Rolls Royce Merlin engines. The manufacture of parts for these engines is in an advanced stage and the first ten units are nearing completion.

G-E Turbine Men Given Promotions

General Electric Co. has announced promotion of three more engineers in the Aircraft gas turbine engineering division as part of a general reshuffling of personnel following the retirement last month of Reginald G. Standerwick as engineer in charge.

Claude H. Auger assumes charge of production engineering, Joseph S. Alford, development engineering, and Richard C. Robin is in charge of engineering general services.

After the retirement of Standerwick, who has been with GE 38 years, the company named S. R. Puffer as his successor. Puffer is also a veteran GE employee and was an assistant to the late Dr. Sanford Moss in developing the first aircraft turbosupercharger. Filling Puffer's former post as designing engineer is D. F. Warner.

In other personnel actions:

Glenn L. Martin Co. appointed D. Roy Shoults chief engineer. A one time General Electric employee, Shoults was vice-president-engineering of Bell Aircraft Corp. from the fall of 1945 until his recent resignation.

Aviation Maintenance Corp. elected Reagan Stunkel chairman of the board of directors, succeeding John H. Fite who has resigned. Stunkel will continue as president, a post he assumed several weeks ago. August C. Esenwein, vice-president and general manager, was elected vice-chairman of the board.

Lear, Incorporated, promoted Richard M. Mock to the position of executive vice-president. He has been vice-president in charge of the electro-mechanical division.

Northwest Industries, Ltd., Edmonton, Alberta, Can., elected Francis George Winspear president to succeed W. Leigh Brintell who has resigned because of ill health. R. M. Montague, formerly vice-president, becomes general manager.

Westinghouse Electric Corp. appointed Joseph F. Chalupa manager of design engineering of the aviation gas turbine division. A Westinghouse employee since 1930, he has been engineer in charge of the project and design section.

Sperry Gyroscope Co. named John B. Wilson treasurer. He will continue as secretary.

Douglas Aircraft Co. appointed George B. Gelly Washington representative. He succeeds Robert H. McRae who has resigned.

Aeromatic Propellers named K. R. Jameson West Coast representative, and Gordon Matthews sales engineer.

Consolidated Vultee Aircraft Corp. appointed Paul I. Stevens works manager of the San Diego division.

Parker Appliance Co. appointed Nicholas Bashark staff engineer in charge of aircraft products.

Plomb Tool Co. named Thomas B. Moule, who has been assistant director of sales in the Los Angeles office, supervisor of sales activities in the eastern half of the country. He will have headquarters at the Chicago office.

Boeing Airplane Co. named T. C. Pitts manufacturing superintendent of the Wichita division.

Ransome Machinery Co., subsidiary of Worthington Pump and Machinery Corp., appointed Allan B. Kime eastern regional manager in charge of sales.

CAA Engine Report Blames Lubrication

In an echo of the suit filed by Empire Airlines, Inc., against Beech Aircraft Corp. to recover the purchase price of five twin-engine Beechcraft, Continental Motors Corp. has released a CAA report on the engine trouble experienced by Empire which, Continental claims, exonerates the engine.

In the suit, filed in June, Empire alleged that it was forced to suspend operations as a result of engine failures. An official of the airline stated that when the engines were disassembled metallic particles were found in the oil sump plugs, indicating that an insufficient quantity of oil was getting to certain bearings.

The CAA report reads in part: "From an analysis of all the factors brought to our attention, it is our opinion that the bearing failures encountered by Empire Airlines were influenced by the lack of proper lubrication at the thrust and impeller shaft bearings. This probably was the result of low temperature operation further aggravated by the presence of gritty sludge.

"It is our understanding that many different brands of oil were used. This could be a contributing factor in the formation of the large amount of sludge reportedly covering all the internal parts of the engine, including the oil filter screen. . . .

"It is our considered opinion that the failures of the thrust and impeller shaft bearings were probably induced by unusual circumstances which led to lack of proper lubrication at these parts."

Bell Negotiations

Negotiations between War Assets Administration and the Carborundum Co. for the purchase of the north plant of Bell Aircraft Corp. at Niagara Falls Airport have been disclosed by H. K. Clark, company president.

Briefing Production News

► **Pratt & Whitney Aircraft** division of United Aircraft Corp. has received an AAF contract to modify, and step up the power on 72 Wasp Major engines from 3,000 hp. to 3,500 hp. at a cost of more than $1,500,000.

► **De Havilland Aircraft of Canada** is negotiating with Ontario Provincial Air Service for sale of 25 Beaver single-engine freighters over the next three years. Cost will be about $25,000 each.

► **Boeing Aircraft Co.'s** first Stratocruiser completed its first seven test flights in as many days and by mid-July had logged more than 11 hr. The first B-50 also has completed seven flights, for a total of nine hr.

► **General Aviation Equipment Co.,** Wilkes-Barre, Pa., is scheduled to have ready for market shortly a small aluminum power jig saw, one of a set of aluminum tools the company has been developing.

► **Glenn L. Martin Co.** delivered five AM-1 Maulers, Navy dive-torpedo bombers, during July and has 25 more in final assembly. Daily test flights are continuing on the two XP4M-1 navy patrol planes.

► **Victor Equipment Co.** has prepared a 20-page booklet, illustrating and explaining its welding and cutting tools, which is available on request. Address: 844-54 Folsom street, San Francisco 7, Calif.

► **Aeroquip Corp.'s** "cost-of-living" allowances, recently announced for employees earning less than $300 per month who have been continuously employed for six months, are: $10.00 per month for wife or fully dependent husband; $5.00 per month for each dependent child under 18 years of age; $25.00 per month maximum.

► **Boeing Airplane Co.'s** Wichita division has completed seven of the 20 Kaydet trainers being overhauled for the Chinese Air Force.

► **Bell Aircraft Corp.,** when it re-opens next week after a two-week vacation shut-down, will expand its helicopter mechanics training course from two to five weeks and admit qualified general students. Previously, admission was limited to company and customer personnel.

► **Curtiss-Wright Corp's** Columbus division has started a plant reconditioning and overhaul program that will cost more than $58,000 for materials alone.

► **Republic Aviation Corp.** closed last Friday for plant-wide vacations. Work will be resumed Aug. 11.

► **Bellanca Aircraft Corp.** has bought two buildings at the former Navy air base at Wildwood, N. J., from War Assets Administration. The two structures, which contain a total of 43,900 sq. ft., will be used for fabrication of parts for the Cruisair, main work on which will continue at the New Castle plant. A flash fire recently swept the interior of two paint shops at New Castle, damaging wing and tail assemblies of unfinished planes.

► **Aerojet Engineering Corp.** has conducted a series of short courses on guided missiles and jet propulsion for military and civilian officials of the U. S. and of foreign countries.

► **Thompson Products Inc.** surveyed a cross-section of the Cleveland factory's 3,700 employees and decided the typical employee: is nearly 37 years old; has been with the company nearly nine years; is married with an average of 1.6 children; earns $1.59 straight time; feels Thompson employment is steady.

► **Lockheed Aircraft Service, Inc.,** is installing an 800,000 gal. water system for fire protection at its MacArthur Field, L. I., base at a cost of more than $150,000.

Bending For Dihedral And Sweepback Simplified On Heavy 75ST Spar Caps

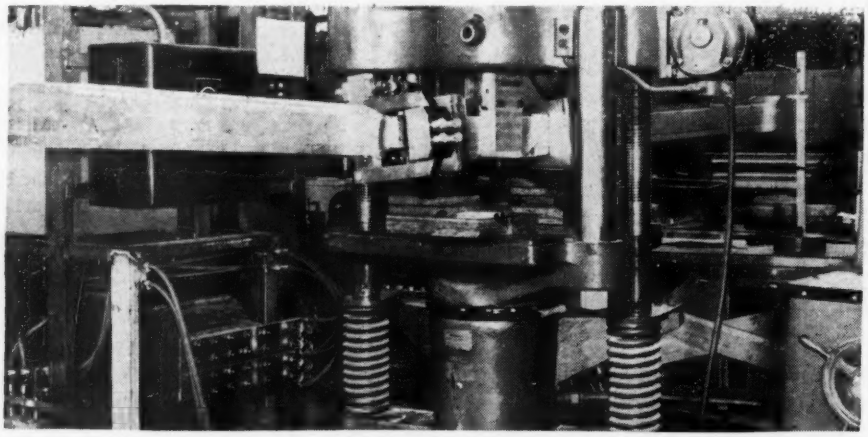
Combination heating-and-bending process developed at Ryan solves difficult production problem of forming large cross-section critical members.

Severe bending of heavy 75ST—one of the newest and strongest aluminum alloys—has been successfully accomplished by new methods at Ryan Aeronautical Co.

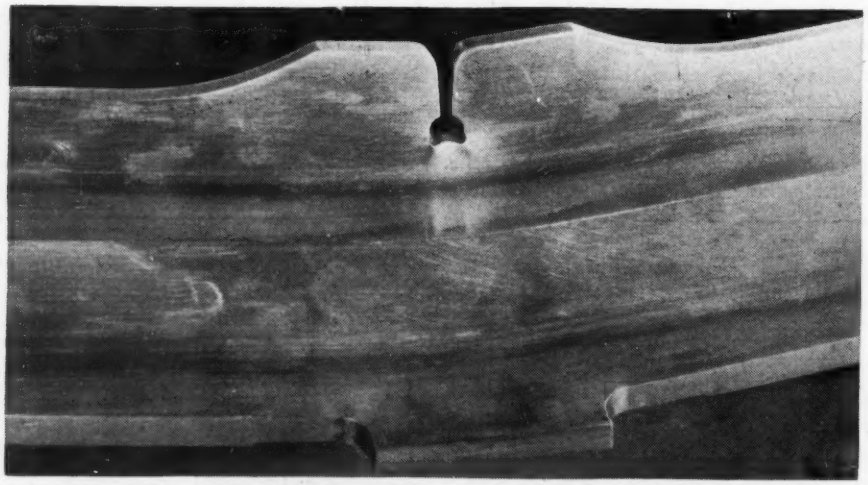
Ryan designers had specified that spar caps were to be Alcoa 75ST with a cross-sectional area of 7 sq. in. Also, they were to be severely bent up for wing dihedral, and bent back to provide sweepback. Heaviest 75ST which had been bent for spar caps, to their knowledge, was about 2½ sq. in. in cross-section.

► **Characteristics of 75ST**—Experience has shown that in the heat-treated condition, this aluminum alloy is very difficult to bend without fracture, also that it is somewhat notch-sensitive. The metal can be formed more easily in the W condition, or immediately after heat-treating, but this desirable status only exists for a very short time. Thus, in production, it would not be possible to perform the bending within the time necessary after heat-treating to take advantage of this transient stage. Most large spar caps have been built up with laminated sections of 14ST aluminum alloy, simpler to form in the T condition.

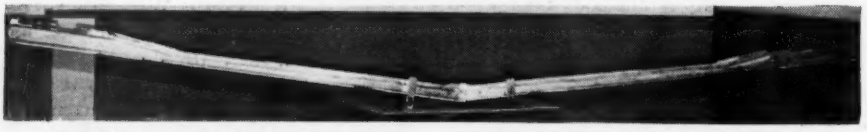
A study of 75ST shows that despite the disadvantage of bending at room temperature, it is easier to work at elevated temperatures than other aluminum alloys. At 275 to 300 deg. F., the metal has better forming qualities than either 24ST or 14ST has at 400 deg. F. Also, there is no material change in mechanical properties of the alloy in this temperature range. There is a slight tensile strength increase—dependent upon the time that the metal is held at temperature, and a slight decrease in elongation accompanies stretching required at the bend area.



LABORATORY SET-UP at Ryan for bending heavy spar cap of 75ST aluminum alloy. Spar cap was heated to 300 deg. F. by current from transformer and Ignitron panel and bent for sweepback in hydraulic press. After re-positioning, unit was bent for dihedral.



CLOSEUP OF 75ST SPAR CAP showing rounded and polished notch in compression leg, for preventing excessive distortion from compression strain during bending.



HEAVY EXTRUSION is seen here after bending for dihedral and sweepback.

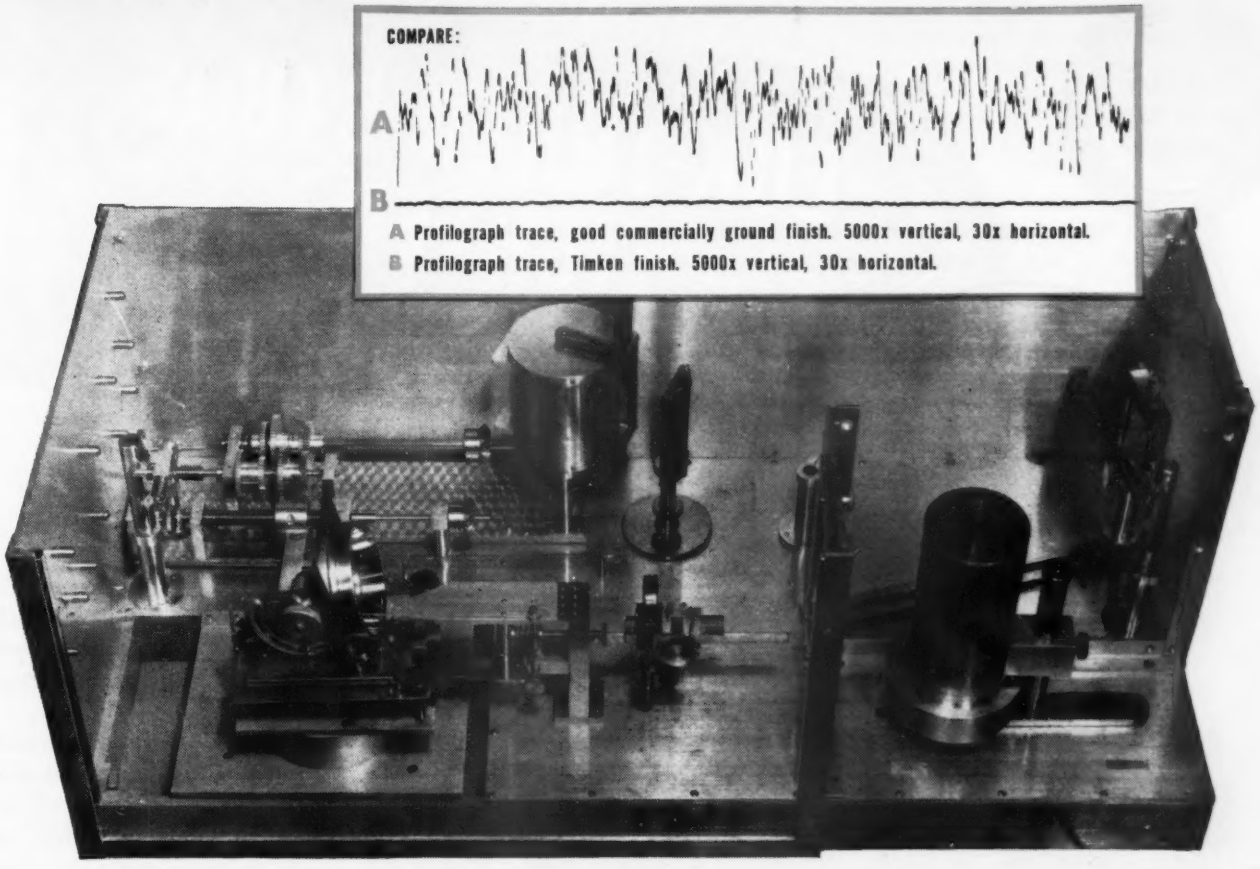
► **How Bending Was Done**—Ryan engineers decided to heat the spar caps and bend them at 300 deg. F. in a special equipment set-up. Kirksite metal rocker blocks installed on the spar cap were contoured to the spar section and insulated from it by Micarta sheets. These blocks rode on greased, hardened steel plates so that they could slide outward under pressure of bending. The spar cap was then placed in a hydraulic press, the steel punch attached to the upper head of the press also being contoured to the spar cap and insulated from it.

For heating the spar cap prior to bending, an Ignitron contactor panel, phase shift control, and transformer were used. Primary plant-current—440-v. 60-c. a.c.—was fed to the Ignitron, the igniters being regulated by a heat control. Current was altered in conformity with the heat control's setting, which automatically determined the percentage of current required. The transformer converted the 400-v. current to 15,000 amp. at 9v. Ignitron, transformer, and conductors were water-cooled to the section to be bent. Spar cap was slightly roughened with 50 grit paper where the conductor clamps made contact. Spacing of the clamps was carefully determined by estimating amount of metal desired between the contacts to produce proper heating effect.

Flow of current between spar cap clamps quickly heated the metal to 300 deg. F., and the hydraulic press then operated. Correct amount of bending was indicated by gages attached to spar cap extremities. After bending for sweepback, spar caps were removed from the press and turned for bending to required dihedral.

Because of the great compression strain occuring during the forming operation, it was necessary to cut notches in the compression legs of some of the spar caps to prevent extreme distortion. These notches were generously rounded and polished, and no danger of premature fatigue failure resulted from their use.

Timken bearings make good airplanes better . . . here's one of the reasons why:


COMPARE:
A
B
A Profilograph trace, good commercially ground finish. 5000x vertical, 30x horizontal.
B Profilograph trace, Timken finish. 5000x vertical, 30x horizontal.

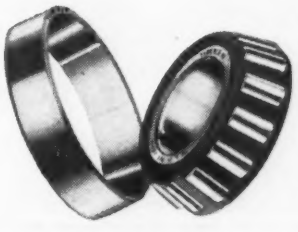
Answers the question— "How rough is smooth?"

ONE of the reasons Timken tapered roller bearings perform with such frictionless, wear-free ease is the amazingly smooth surface finish on the rolls and races —the finest known to modern bearing science.

Now, when you talk about finishes like this, you're talking about surface irregularities of only a few millionths of an inch—irregularities which are impossible to detect by any ordinary means. So, when Timken first began to develop this finish, one of the biggest obstacles was the absence of an accurate method of measuring the roughness of an apparently smooth surface.

The profilograph pictured above was the answer. Developed by Timken in 1928 and steadily improved since then, the profilograph determines surface irregularities to within one-millionth of an inch. Equipped with this measuring stick, Timken engineers were able to develop new finishing methods and machines, which have resulted in the microscopic surface accuracy of the Timken bearings you use today.

Every factor in the efficiency of a bearing is approached at Timken in this same scientific manner. For example, Timken makes its own steel to assure constant quality. And Timken is the acknowledged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels. No wonder you can always be sure of uniformly top quality and performance in the Timken bearings you use. The Timken Roller Bearing Company, Canton 6, Ohio.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION ✳

LOK-THRED STUDS are TIGHTER and STRONGER

IN ANY APPLICATION where studs are used, "LOK-THRED" Studs will lock more securely and prove stronger in both tension and torsion than American National Threads.

The "LOK-THRED" design avoids the chief weakness of ordinary interference fit, which places the metal of the receiving thread under shear and thus tends to cause a bursting or splitting action.

Note these other important advantages of "LOK-THRED" which are explained fully in the new booklet pictured here:

1. **Modified American National Thread permits use of standard tools. (Page 6.)**
2. **Does not require selective fits. (Page 6.)**
3. **Locks securely and becomes tighter in service. (Page 9.)**
4. **Carries entire normal working load on 6° angle at root of thread under high compressive prestress. (Page 11.)**
5. **Does not gall when being driven nor fret in service. (Page 12.)**
6. **Stronger in both tension and torsion than ordinary American National Threads. (Page 12.)**
7. **Has much higher fatigue limits than studs with conventional threads. (Page 13.)**
8. **Acts as dowels and taper pins. (Page 16.)**
9. **Seals positively and eliminates added bosses and blind tapping. (Page 17.)**
10. **Re-usable and on any re-application less than one-half additional turn brings torque back to its original installation value. (Page 17.)**

Write for "LOK-THRED" Booklet for full information.

National PRODUCTS

THE NATIONAL SCREW & MFG. COMPANY, CLEVELAND 4, OHIO

New Accuracy Attained In Gaging Metal Wear

Location as well as degree of wear can be measured by process which eliminates shortcomings of old methods.

Research, design, production, and maintenance engineers today can measure increments of metal wear as small as .00001 in.

Developed at the National Bureau of Standards by S. A. McKee in collaboration with Dr. H. C. Dickinson, this measuring process can be applied to aircraft parts and to such other items as gages and dies.

By applying to the working surfaces narrow diamond-shaped markings showing a definite change in one or more readily measurable dimensions after relatively small amounts of wear, the special McKee gage employed provides a determinable indication of wear where the marking is made.

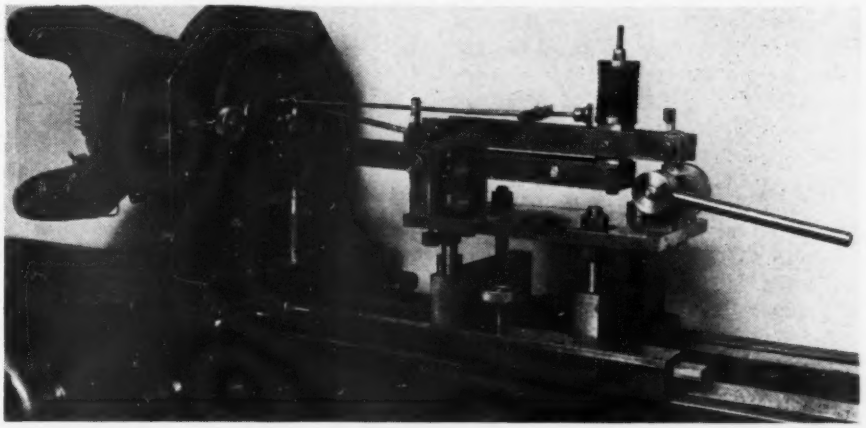
Extensive tests have provided conclusive evidence that this indentation method overcomes shortcomings of other methods. Thus, the weighing method gives a value for the total wear but does not indicate where the wear occurred. Measuring the changes in the dimensions of a worn part has this same limitation to a lesser degree and does not differentiate between actual wear and other changes that may occur, such as shrinkage or distortion. And the method of determining the amount of worn material found in lubricant after operation, also presents many difficulties and usually is used only as a qualitative indication in conjunction with other data.

▶ **Method's Application**—The McKee gage was designed primarily to locate and measure indentation marks on cylinder walls and pistons of aircraft radial engines, since permanent distortion of such parts during operation had previously nullified the significance of any former methods of measurement. The indentation principle also would be applicable to other aircraft industry elements where the material is of such a nature that the indented marks will retain their shape in service. Thus, a mark placed on the surface of a production die would readily indicate when it had been worn beyond specified tolerances.

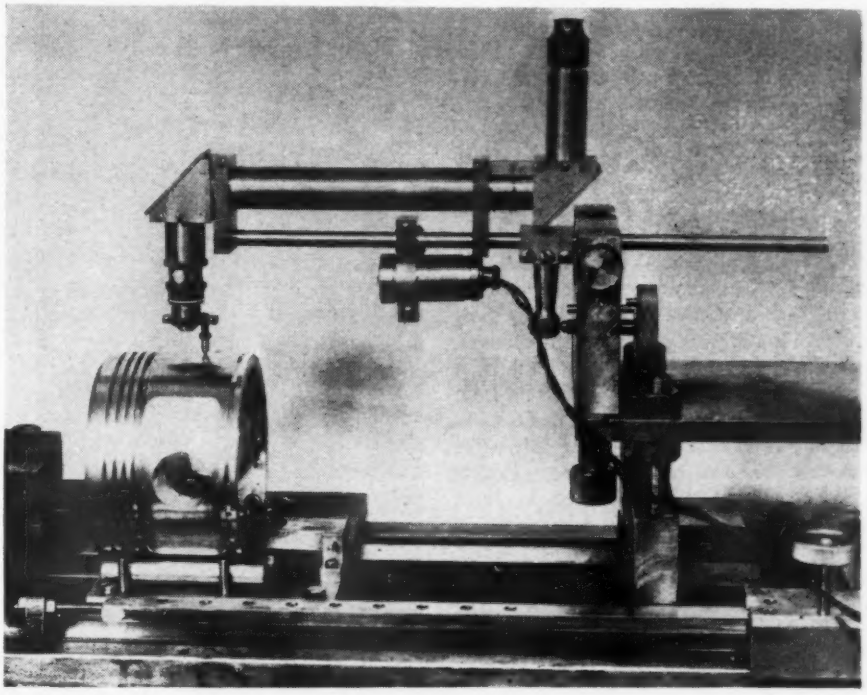
With a cylinder or piston mounted in a specially designed fixture, marks are applied at any desired position with a diamond point forced by mechanical pressure to a predetermined depth into the part. The viewing and measuring apparatus, consisting of a conventional microscope and eyepiece scale, is modified by the addition of two right angle prisms so that it may be used as a periscope for viewing the inside of the periscope at the same settings—vided so that a mark made at given pin settings will fall within the field of vision of the periscope at the same settings—eliminating loss of time in searching for marks which are very small.

▶ **Characteristics of Mark**—Impression of the mark in the metal surface raises a burr around the mark. Shape of the diamond indentor is such, however, that the major portion of the burr is formed on the sides of the mark. Though no burr is visible at the ends of the marks, presence of a very slight surface elevation may account for the minor deviations from a straight line shown by calibration curves. It was found that most of the burr could be easily removed by rubbing lightly with fine polishing paper. For use with cylinders, a sheet-metal guard was found convenient, the guard holes being so arranged that polishing paper can be rubbed over a small area at each mark with one finger. Possible use of cutting or grinding methods for producing marks without burrs and sharp-pointed ends presents a promising field for further investigation. If this can be accomplished, accuracy of determining wear would be increased.

Since the marks are placed with the long axis perpendicular to the cylinder axis, relation between the change in depth of mark to change in length of long axis is affected by the curvature of the cylinder. While



APPARATUS UTILIZING DIAMOND INDENTATION METHOD for measuring extremely small increments of wear. Engine cylinder is seen mounted in fixture with gage in position to mark surface. Relatively small amount of wear will make definite change in one or more measurable dimensions of mark, providing very accurate indication of wear at its location.



MICROSCOPE AND EYE-PIECE SCALE modified as periscope constitutes viewing and measuring apparatus used in conjunction with McKee wear gage. In this setup, apparatus is being used to view and measure changes in dimension of mark placed on piston surface to determine amount of wear.

this effect was relatively small for the particular cylinders used, suitable corrections for curvature would provide greater accuracy in determining wear.

A study was also made of the possibility of error resulting from the axis of the indenter not being at right angles to the surface when indentation is made. Computations indicated that if the diamond-shaped mark was symmetrical to within a ratio of not less than 41 to 50 along its major axis, the error would be no greater than one percent (approximately 0.00001 in.). It was found that the apparatus could be adjusted to produce a symmetrical mark, and that other marks, either in the same cylinder or in other cylinders of the same nominal size, could be made well within the limits of symmetry without further adjustment.

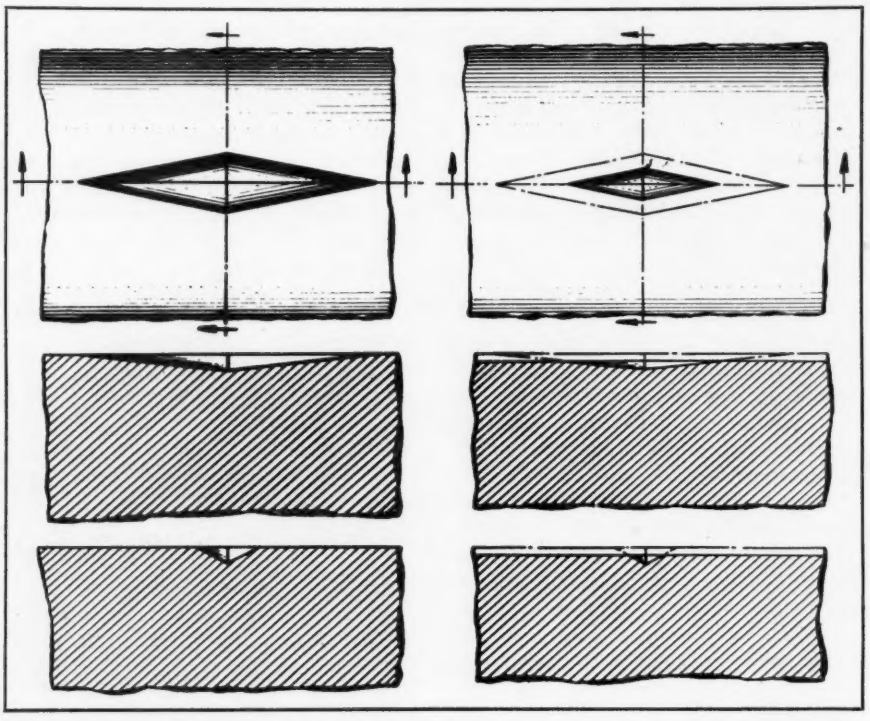
▶ **Test Data**—Results of a number of engine tests have shown that marks in engine cylinders retain their shape sufficiently to provide reasonably accurate wear measurements. Experience has indicated that results are not as satisfactory after the marks have been worn to about one-fourth or less of their original length. Hence, greater accuracy may be obtained by carefully regulating the size of the mark and duration of the test, to prevent this condition.

Precision of the wear measurements depends upon the condition of the indentation. With new marks, points are sharp and the lengths can be accurately determined. But, after the engine has been operated, the marks are somewhat blunted and it is necessary to estimate the position of the point. Under normal conditions, the cylinder wear can be determined with an overall accuracy of 0.00004 in. and for more favorable conditions, to 0.00002 in. (Operating experience with marks in the pistons indicates that, with the softer aluminum alloy, the marks have a much greater tendency to distort and results are not entirely satisfactory, another difficulty being tendency of the metal to become impregnated with carbon, making it difficult to distinguish the marks.)

Most of the tests for determining the performance of the marks in service were made with Pratt and Whitney R-1535 engines having chrome-moly steel cylinder barrels of 5 3/16-in. diameter. In these tests 24 marks were made in each cylinder, 6 being spaced 60 deg. apart at each of 4 levels—approximately 2, 4, 6 and 8 in. from the cylinder skirt end. Upper row of marks was in contact with the top ring only while low row was contacted by oil ring. Typical cylinder wear patterns obtained in these tests reveal unsymmetrical wear with respect to the axis of the cylinder, which would be impossible to determine with usual measurements of diameter.

The McKee gage provides particular advantage of an indication of wear only, whereas usual measurements of changes in diameters of the pistons and cylinders do not differentiate between wear and distortion that may occur during a test. It also indicates wear at a particular point on the surface, whereas measurements of diameter involve changes at two points and practical means are not generally available for determining the amount of wear at each point. Also, the method does not require the careful technique found necessary to measure diameters with corresponding accuracy.

Since temperature variations do not materially affect the accuracy with the indentation method, it is not necessary to bring the part to a definite temperature before making measurements.



ENLARGED DIAGRAMS of typical indentation made with McKee wear gage. Views at left (top to bottom) are plan, longitudinal, and transverse sections of mark before wear, while those on right represent same mark after material has been worn. Shape of mark remains substantially same, but length decreases in proportion to thickness of material removed. For the diamond employed, ratio of depth to length of long axis is about 1 to 35 —mark about 0.001 in. deep having long axis of about 0.035 in.

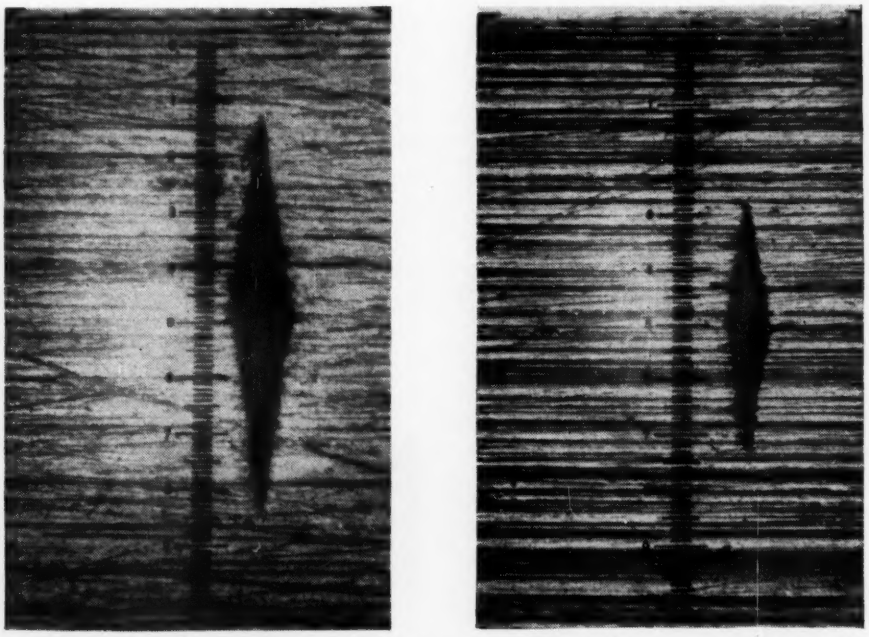


PHOTO OF TWO TYPICAL MARKS (after engine operation) used for determining extremely small increments of cylinder wear by diamond indentation method. Marks were originally about 0.9 mm. (.0355 in.) long. Scales shown represent actual length of 1 mm. (0.0394 in.), but when observed in viewing apparatus are 2½ in. long. For diamond used and chrome-moly steel cylinders, total length of scale represents about 0.0012 in. in depth; hence one small scale division is equivalent to slightly more than 0.0001 in. of wear. This gives idea of order of sensitivity of method.

"So wonderfully smooth...Mother slept all the way!"

But air travel hasn't always been so smooth, so restful, so popular. One of the big improvements in modern planes is the use of more responsive, more dependable control cables.

For example, many of today's smoothest riding airliners are rigged with U·S·S American TIGER BRAND Control Cables as standard equipment. For these superior cables have proved, through millions of air miles . . . in every kind of wartime and peacetime service, that they have the sensitive response and reliable strength to assure flawless performance under every flying condition.

American TIGER BRAND Control Cables are made of Excellay Preformed construction to close tolerances and unvarying quality standards from the finest cold-drawn high tensile strength coated or corrosion-resisting (stainless) steel wire.

Our air-minded technicians welcome an opportunity to discuss TIGER BRAND Control Cables and other U·S·S Aircraft Products with you. Write, wire or call the nearest office.

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United States Steel Export Company, New York
UNITED STATES STEEL

7-929

Mounting Jet Engines

Basic design considerations for proper installation of new type power plants shows versatile arrangements possible.

By J. C. BUECHEL,
Aircraft Gas Turbine Div., General Electric Co.

Though much has been written on jet engine design and operation, little has been said on a vital subject—mounting.

Presented here, then, are design considerations, using as a case history the General Electric J-35 (TG-180), on which a Design Analysis was presented in AVIATION WEEK, July 7 and 14, 1947.

Requirements for a satisfactory mounting installation of aircraft engines may be broken into four major considerations:

▶1. The mounting should isolate, or absorb vibration between the engine and aircraft structure;

▶2. It should safely carry the weight, inertia, and gyroscopic loads encountered during any operation of the aircraft;

▶3. It should prevent loads due to contraction and expansion of the engine, and those due to airplane structural deflections from being carried into the engine.

▶4. It should allow quick installation and removal of the engine.

▶**Engine Vibration Isolation**—In mounting a reciprocating, or any propeller type engine, the reciprocating pistons and propeller produce large amplitude vibrations which must be isolated from airplane structure. This necessitates the use of rubber mounts and results in a comparatively high weight for the mounting structure. The turbojet, having no propellers and a single rotating shaft mounted on precision bearings, has a low amplitude vibration with a frequency equal to engine speed. The TG-180 is designed to a maximum peak to peak vibration amplitude of .003 in., and a value of .005 in. is cause for removal for inspection. This means that no special provision for vibration isolation is necessary in mounting the engine.

Considerable flight test experience has shown that metal to metal contact can successfully be used in mounting jet engines. However, good engineering practice dictates the desirability of using a vibration absorbing material between the engine and airplane structure to avoid possible fatigue failures over long periods of time.

▶**Loading Considerations**—The design of the mounting from the loading viewpoint can best be considered from both the engine and airplane point of view separately. The types of load to be expected are:

▶1. Thrust load due to thrust developed by the engine.

▶2. Vertical loads, which are really weight loads of the engine and vary under pullout, gust, and landing conditions.

▶3. Lateral loads due to gusts and some turn maneuvers of the plane.

▶4. Gyroscopic loads, which are a result of yaw or pitch maneuvers. This type of load produces a couple which would be taken by the trunnions alone under a pitch maneuver and by the front support and trunnions in a yaw maneuver. The engine tends to move in the opposing plane to that in which the airplane moves. That is, if the airplane yaws, the engine will tend to pitch, and vice versa. The magnitude of the gyroscopic couple may be calculated:

$$C = \frac{I\omega_\omega}{g}$$

C = Couple — ft-lb
I = Moment of inertia of engine rotating parts — lb-ft²
ω = Airplane rate of procession — rad/sec
ω = Engine speed — rad/sec
g = 32.2

▶5. Combinations of the above loads per engine specifications. Actual loads on the engine will always consist of two or more.

▶**Engine Design**—With these considerations as a basis, the TG-180 engine was designed to utilize a 3-point type of mounting, as shown in Fig. 1.

Main pads are located on the midframe as near CG as possible so that they carry the major portion of the vertical loads. The third support point can be on either top or bottom at the forward frame, or at the top on the forward turbine flange. To illustrate the load reactions at the support points, Fig. 2 shows these reactions under a vertical loading condition, and Fig. 3 under gyroscopic loading conditions. In a similar manner, the reactions for other types of loading conditions can be set down and values determined. Those loads may reach values of 10,000 to 15,000 lb. at any of the points indicated.

Assuming the engine has been designed to take the various loading conditions, the pad design itself brings about certain considerations. Fig. 4 shows a detail of the main trunnion pad. The hole in the center of the pad is held to .001 in. on the diameter and serves as a rabbet for the mating trunnion. The bearing area of the rabbet, hole diameter multiplied by rabbet depth, determines the bearing area which takes the vertical loads applied at the trunnion. It must be assumed that the bearing area will take the load inasmuch as it is not desired to load the attachment bolts, and friction between the pad and the trunnion cannot be accurately determined since it depends on variable torque applied to the bolts. To avoid crushing the pad, under high load conditions, the mating trunnion must utilize the depth of rabbet specified.

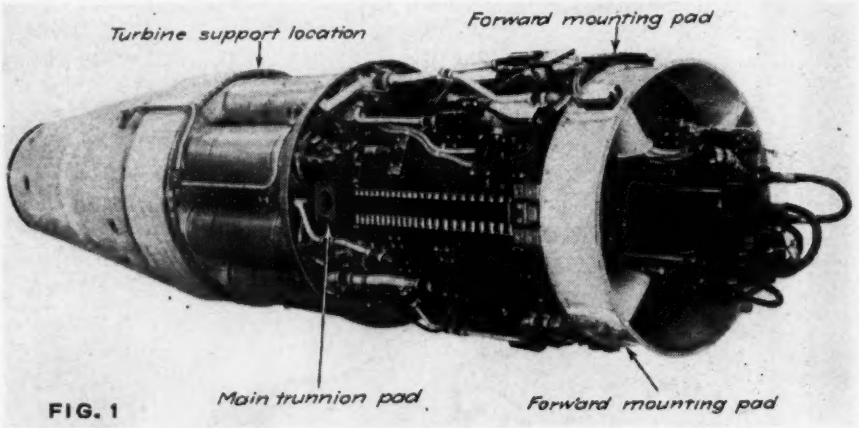

FIG. 1

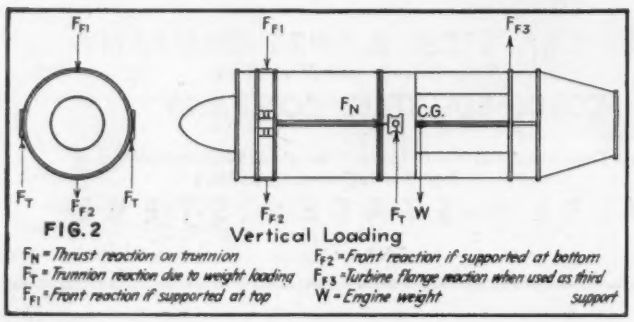

FIG. 2 Vertical Loading

F_N = Thrust reaction on trunnion
F_T = Trunnion reaction due to weight loading
F_{F1} = Front reaction if supported at top
F_{F2} = Front reaction if supported at bottom
F_{F3} = Turbine flange reaction when used as third support
W = Engine weight

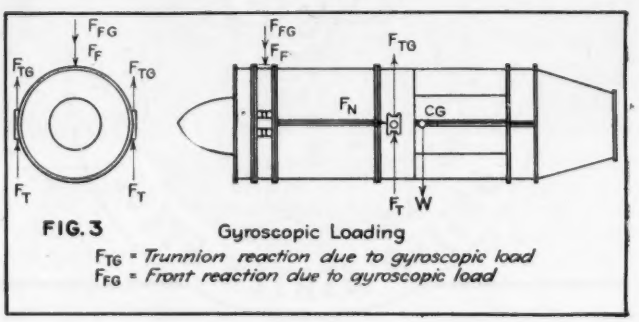

FIG. 3 Gyroscopic Loading

F_{TG} = Trunnion reaction due to gyroscopic load
F_{FG} = Front reaction due to gyroscopic load

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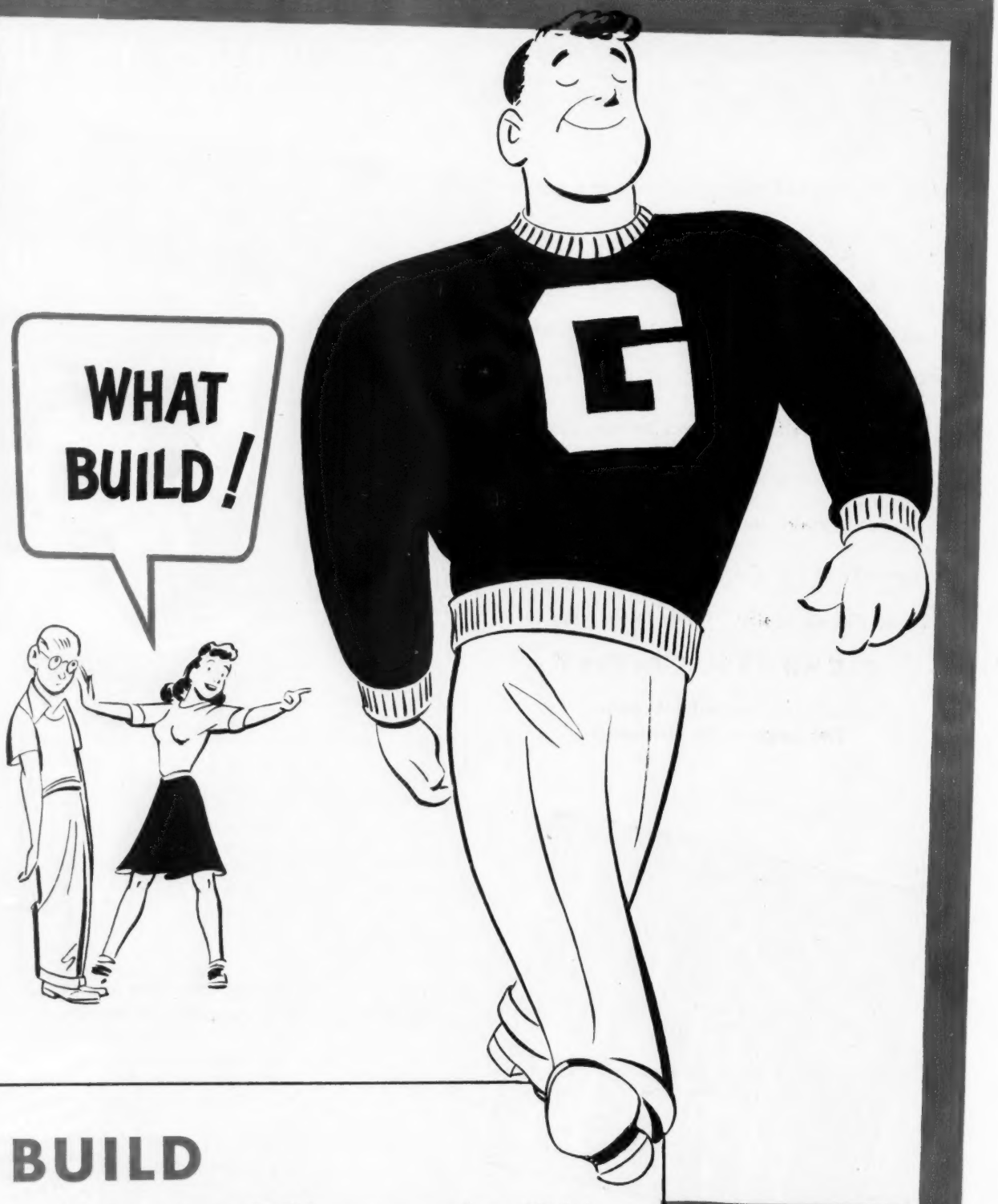

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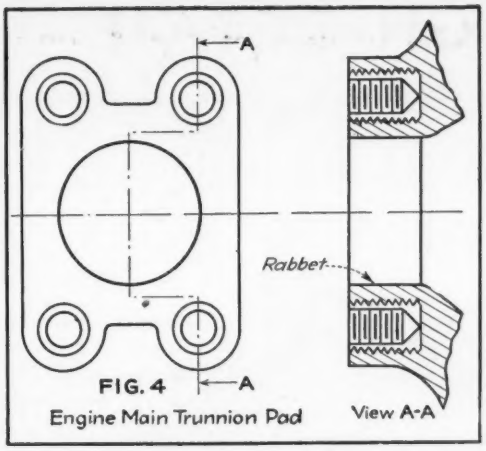


FIG. 4
Engine Main Trunnion Pad

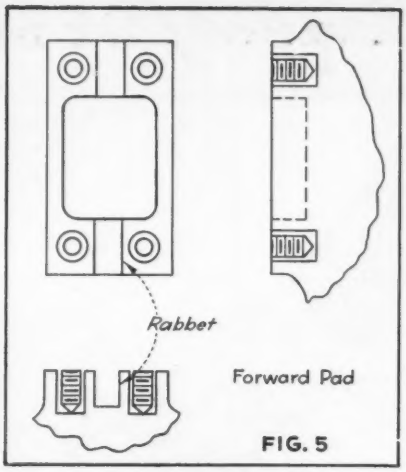


FIG. 5

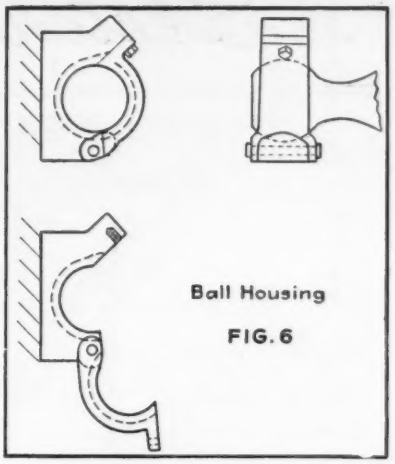


FIG. 6

Although the mount would not actually fail if the trunnion pad were overloaded to the point of crushing, a loose fitting trunnion may result. Thus, the load would be transmitted to the attachment bolts with resultant uncertainty as to load distribution and possible seizing of attachment bolts.

Inasmuch as the midframe is aluminum or magnesium alloy, the attachment bolt holes are provided with steel bushings. The bushing size is determined by the load resulting from the moment due to vertical load applied at the trunnion support times the distance between the point of support and pad face. The resisting couple is then the attachment bolt load times the vertical distance between the attachment bolts. The bushing is made of sufficient size to enable the use of a trunnion length, based on experience, suitable for any installation.

Fig. 5 shows a detail of the front support pad design from which a drag link type of support is used. The drag link normally is at an angle to the pad face, in a fore and aft direction, and a rabbet is provided to relieve shear loads from the attachment bolts. The greatest loads on this pad are present under gyroscopic conditions which can result in a pulling load on the bolts. Bushings are therefore provided to enable these loads to be taken, inasmuch as the forward frame also is either magnesium or aluminum.

The forward turbine flange is part of the aft frame structure, and the weakest point would be the turbine flange bolts. Therefore, if this flange is used as a third support point, a specific number of bolts must be picked up by a bracket.

► **Aircraft Mount Design**—The aircraft designer's problem is similar since the same loads acting on the engine also act on the airframe. The first problem is to provide rigid structure to mount the engine. The versatility of the engine in enabling the use of either front or aft points for the third support, aids in mounting the engine as some installations may be able to provide structure at one place but not at the other.

Considering first the main trunnions, a method of attachment must be provided between airplane structure and the engine. The trunnion recommended for the TG-180 consists of a ball and socket combination basically as shown in Fig. 6. This configuration meets the second requirement of a satisfactory mount merely by designing sufficient "beef" into it. The shorter the distance between the point of support and the pad face, the smaller and lighter need the trunnion be. This also favors the engine pad by putting less load on the attachment bolts. The trunnion flange should be sufficiently rigid so that under high loads it will not tend to arc between the bolts and thus impose a prying load on them.

The third mounting requirement is taken care of as follows:

A. Provision for radial contraction and expansion of the engine is accomplished by making one trunnion a fixed ball and socket, the other a sliding journal in a ball. The amount of expansion is small and can be readily provided for in the trunnion design as shown in Fig. 7.

B. Relative movement between ball and socket, and journal and ball isolates loads, due to airplane structural deflections, from the engine.

The fourth mounting requirement is met by being able to design the socket portion of the trunnion with a quickly detachable latch mechanism as shown in Fig. 6. The ball housing is designed so that even with the latch open the engine would still be held in the airplane. This is accomplished by bringing the bottom portion of the housing above dead center, thus requiring a slight amount of lift on the engine before it would move backwards.

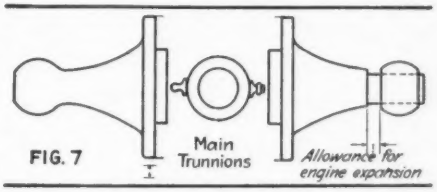


FIG. 7

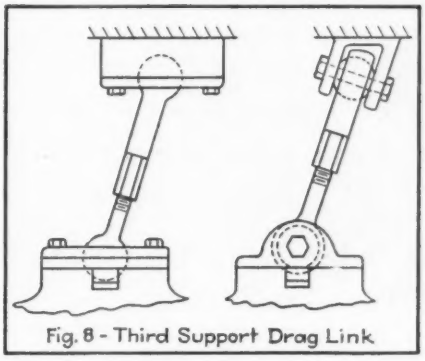


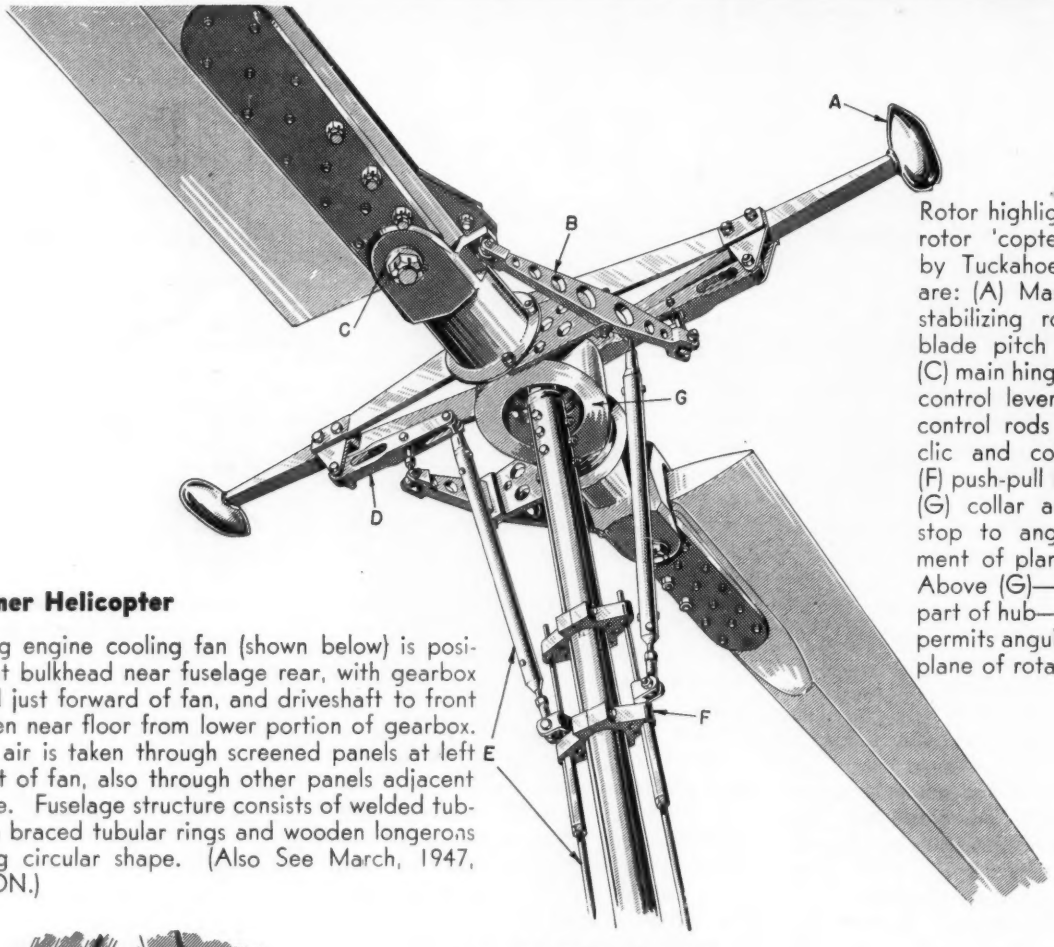
Fig. 8 - Third Support Drag Link

Considering the third point of support again, a method of attachment must be provided between airplane structure and engine. A drag link type of support, shown in Fig. 8, is recommended for this purpose. Sufficient strength is provided by making the link of the proper material and size to take the gyroscope loads applied. When located at the front of the engine, a small amount of axial growth between the main trunnions and the support point is readily provided for by the ball and socket configuration. Relative movement of the balls in their housings enables the engine to grow freely.

This design also allows for horizontal engine alignment through the threaded portion between the two halves of the link. Sufficient threaded area must be provided so that any adjustment made will still leave an adequate number of threads in contact to give required strength to take the loads imposed. Easy removal is again provided by unbolting no more than four bolts to break the connection. On some installations, this support may ride in a track and be held in place by a simple lock.

The same type of support can be used at the forward turbine flange but greater allowance for radial and axial thermal expansion of the engine must be allowed for at that location.

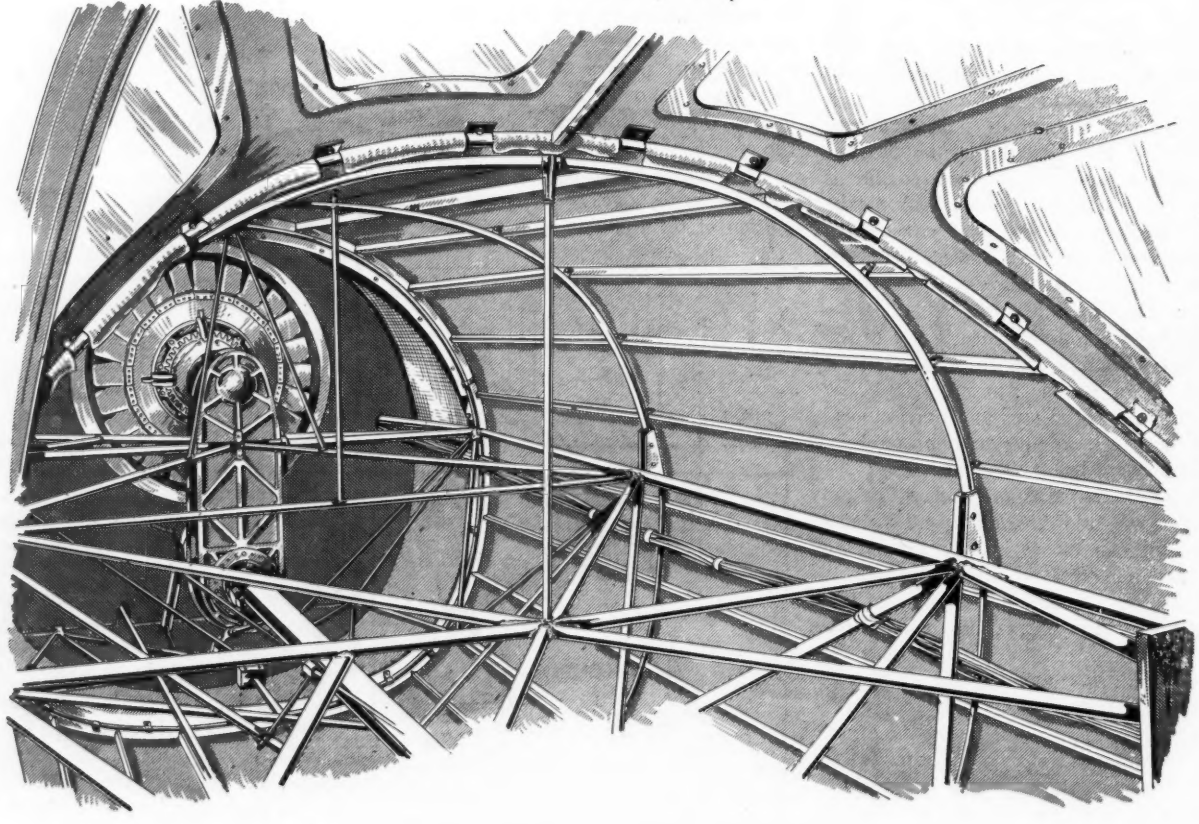
A standard mount of this design could be used on all airplanes; however, due to the fact that the loads imposed vary between fighter and bomber aircraft, it is possible to use a somewhat lighter design on the bombers with some saving in weight. Too, variations between airplanes make it desirable to design the mount to meet the specific installation. Therefore, at least up to the present, it is considered more desirable to let airplane design govern size and construction of the ball and socket configuration.



Rotor highlights of tandem rotor 'copter constructed by Tuckahoe, N. Y., firm are: (A) Mass balance for stabilizing rotor head, (B) blade pitch control lever, (C) main hinge pin, (D) pitch control lever, (E) push-pull control rods actuating cyclic and collective pitch, (F) push-pull rod guide, and (G) collar acting as limit stop to angular displacement of plane of rotation. Above (G)—as an integral part of hub—universal joint permits angular variation of plane of rotation.

deLackner Helicopter

Lycoming engine cooling fan (shown below) is positioned at bulkhead near fuselage rear, with gearbox mounted just forward of fan, and driveshaft to front rotor seen near floor from lower portion of gearbox. Cooling air is taken through screened panels at left and right of fan, also through other panels adjacent to engine. Fuselage structure consists of welded tubing, with braced tubular rings and wooden longerons providing circular shape. (Also See March, 1947, AVIATION.)



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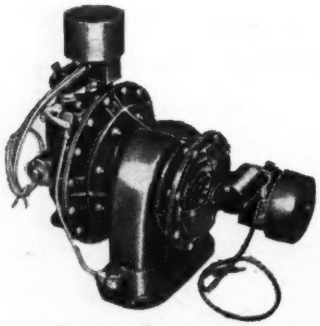
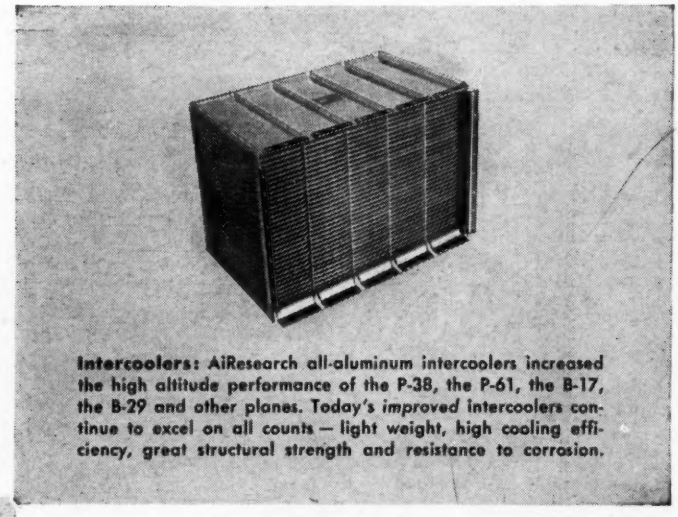
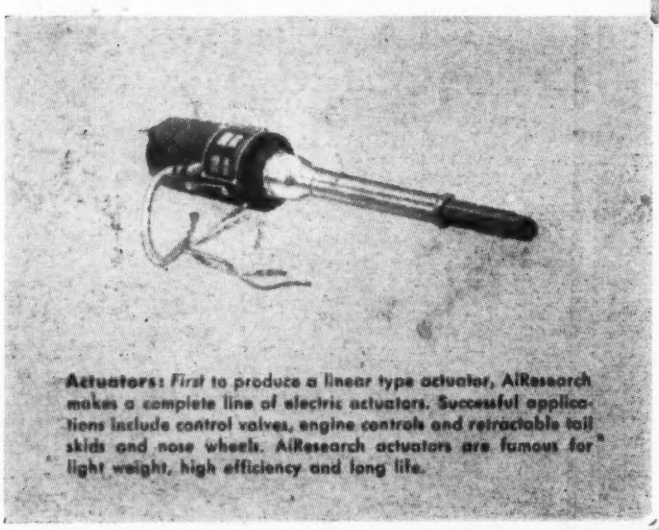
AiResearch



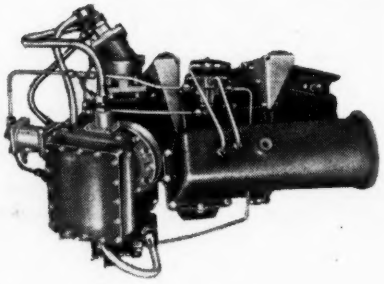
Cabin Pressure Regulators: Perfected for use on the B-29, AiResearch regulators are easy to maintain and revolutionary in performance. They operate on the pressure differential between cabin and outside air, with no other source of power. Cabin altitude and rate of change can be pre-selected.



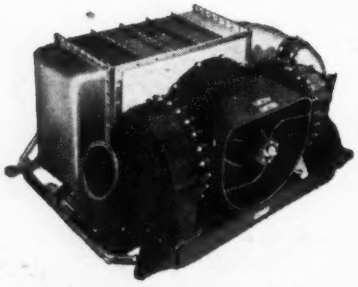
Intercoolers: AiResearch all-aluminum intercoolers increased the high altitude performance of the P-38, the P-61, the B-17, the B-29 and other planes. Today's *improved* intercoolers continue to excel on all counts — light weight, high cooling efficiency, great structural strength and resistance to corrosion.



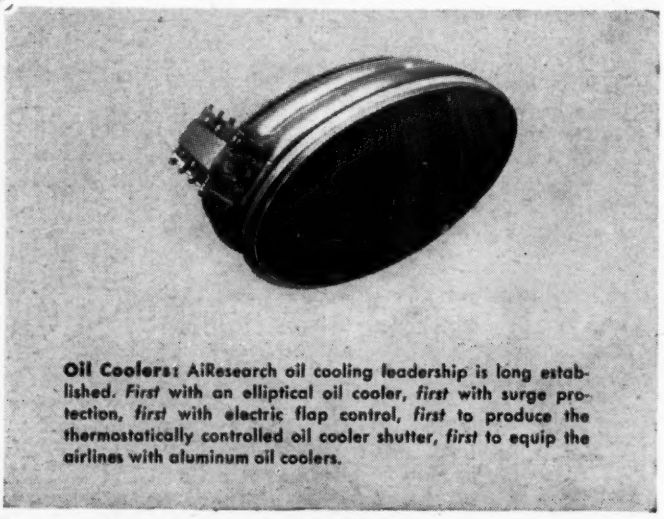
Actuators: *First* to produce a linear type actuator, AiResearch makes a complete line of electric actuators. Successful applications include control valves, engine controls and retractable tail skids and nose wheels. AiResearch actuators are famous for light weight, high efficiency and long life.



Cabin Superchargers: This high speed compressor for the new Constellation creates 50 pounds airflow per minute at an output pressure of 15 p.s.i. Variable speed drive keeps output constant despite changes in engine speed. A primary compressor is being produced for the Convair 240.



Refrigeration Units: Used for cooling hot, compressed air from the cabin superchargers, this new Constellation unit incorporates an air expansion turbine, secondary compressor and heat exchanger. Types being produced for various planes have capacities from 7 to 100 pounds airflow per minute.



Oil Coolers: AiResearch oil cooling leadership is long established. *First* with an elliptical oil cooler, *first* with surge protection, *first* with electric flap control, *first* to produce the thermostatically controlled oil cooler shutter, *first* to equip the airlines with aluminum oil coolers.

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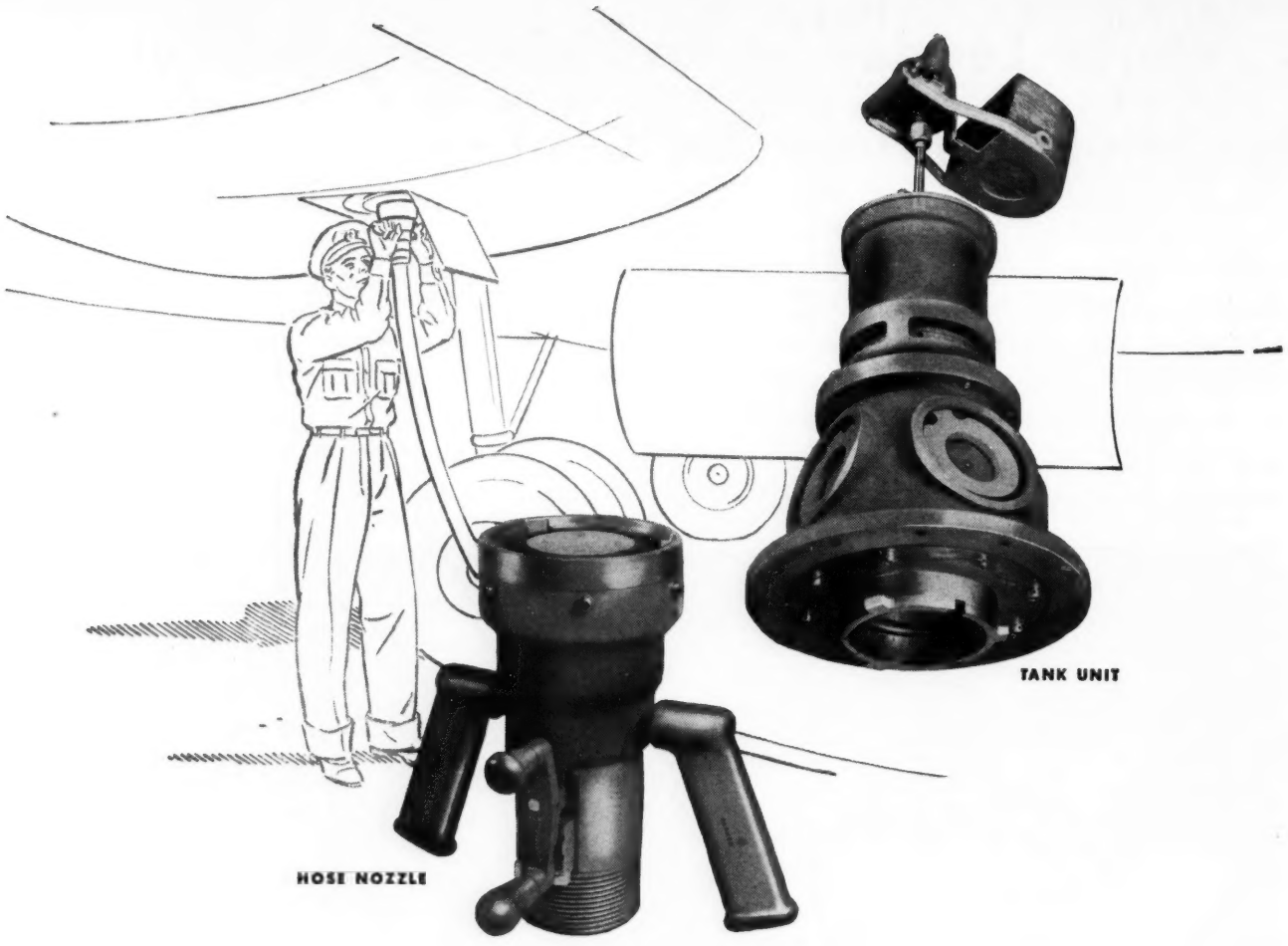
AiResearch is equipping with either complete "cabin comfort" systems or vital component parts the newest planes of Boeing, Consolidated Vultee, Douglas, Lockheed, North American, Northrop, Republic.



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Simplifying Airborne Radar

West Coast firm develops anti-collision, terrain scanning unit weighing but 65 lb. which can be contained in housing 19 in. wide and less than 1 ft. deep.

Simplification of airborne radar is evident in the 65-lb. unit now under development by Allison Radar & Equipment Co. of Los Angeles.

Refinements of operation tailored to demands of pilot and copilot are being incorporated in the unit, which can be housed in a container 19 in. wide and less than 1 ft. deep, holding all operating mechanism required for the wartime APS-10 scope radar weighing 165 lb.

With its twin 18-in. rotating "dish" reflectors, the entire assembly has a vertical depth of 30 in., and has been designed for mounting in any four-engine transport without disrupting the nose configuration other than to replace with a plastic shell the metal skin in the field of the set's 6-deg. radar beam, which covers an arc of 180 deg.

The set is designed to operate from the 400 cycle, 115 v. single-phase main power supply of a U. S. four-engine transport, and in operation draws 600 W. Surveys of the Constellation, DC-4 and DC-6 indicate that their power systems are ample to meet the demands of the radar. Under crystal control, the unit operates at a frequency of 9375 megacycles.

Technical advancements displayed in the Allison unit are the result of a year and one-half of development by Donald K. Allison, chief engineer of the company bearing his name, and four engineering associates who were active in military radar design.

▶ **Stabilizing Feature**—An outstanding feature of the set is the stabilization of its two reflectors (mounted back-to-back) by a single small gyroscope installed between them. In wartime airborne radar sets stabilization of the beam in its sweep was sought —not always effectively—by mounting in the aircraft two gyroscopes, with an electrical takeoff from them to a servo amplifier feeding two stabilizing motors that controlled alignment of the dish. A weight profit of 40 lb. as well as mechanical simplicity is claimed for the Allison gyro stabilizer.

An interesting evidence of weight economy is the mounting of the dishes. Wave guides carrying power respectively to the two dishes are employed also as dish suspension arms.

Removal of the cover of the unit's control housing discloses a compact arrangement of nine principle electronic and mechanical components, so arranged that units or parts of units can be removed easily for inspection or replacement. Hub of the arrangement is the motor rotating the suspended dishes at 30 rpm. to provide the cockpit 'scope with 60 scans per min.

Grouped about the hub are the unit's intermittent frequency amplifier strip; radio frequency wave guide; magnetron; power burst modulator; clystron; auto frequency control strip; low-voltage power supply takeoff; scanner driving mechanism and gear box; and the radio frequency switch that electronically cuts in power to each dish as it enters its 180-deg. sweep and cuts off power as it leaves its field of search.

Pulsing of the beam is in two and one-half micro-second bursts at the rate of 400 bursts per sec. throughout its sweep. Allison's mechanical cable drive of the set's scope scanner is considered by the designer to be a weight and trouble eliminator, saving the use of two synchronizing and interlocking electric motors.

▶ **Weight Saving**—Grouping this equipment within a single light-weight housing offers advantages of weight savings over old-style radar sets that required separate housings for their various electronic and mechanical components. Reduction of interconnecting wiring saves weight, and also reduces maintenance, inspection and trouble-shooting problems.

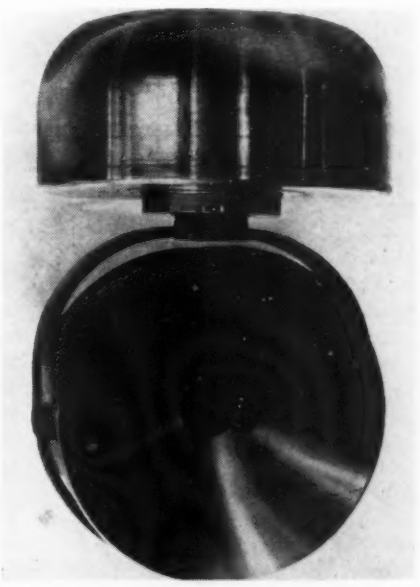
In attempting to give the pilot a maximum display of terrain and sky ahead, and in a manner requiring minimum training in interpretation, Allison engineers have sought to reduce to the lowest number the manual controls of the apparatus. Aside from the main power switch, the pilot is confronted with only three control knobs mounted directly beneath the 'scope.

Knob at the extreme right controls intensity of the 'scope's luminosity; the central knob is for caging the nose unit's gyro stabilizer; and that at the left is the range selector, its three positions identified both by feel and by white, green and red light side illumination of a Plexiglas 'scope cover engraved with range and azimuth lines.

▶ **Scope Details**—The scope is an RCA "A" type of high persistence and high intensity. While the pilot views a scanning of the scope at the rate of 60 scans per min., there similarity to the conventional radar scanning ends. Because the impulse dishes, rotating in the nose of the airplane, are set at slightly different angles two separate fields of search are covered; one beam sweeping directly ahead and up, the other, tilted downward 10 deg., sweeping the terrain.

Results of their search are transmitted al-

COMPARATIVE SIZE AND WEIGHT of new lightweight Allison Radar & Equipment Co. unit (left) with older unit is clearly shown here.



CLOSEUP OF ALLISON RADAR shows simplicity and clean design of unit.

ternately to the scope. Objects picked up by the sky-searching beam appear on the scope with intense luminosity. The scope pattern traced by the terrain scanning beam is four times less luminous.

The terrain map scan will have less persistence as contrasted with the brightness and

INSPECTION AND REPLACEMENT of electronic units are simplified by design permitting easy access simply by removing cover of control housing.

long persistence of objects caught in the sky scan. A feature of the ground scan is that it will not show any of the terrain more than 5,000 ft. distant from the plane, thus eliminating one confusing factor.

As with other radar scope sets, users of the Allison device must be trained in evaluating what is seen on the fluorescent screen. Allison says that hills will show a sharply defined shadow on the scope as contrasted with the diffused "blobs" outlining rain storms and heavy cold formations.

► **Tests Soon**—While the initial set will not be ready for airborne tests for another several weeks, Allison says that field tests of his equipment have established its ability to pick up and identify a four-engine airplane at distances up to 20 mi. A Cub-type trainer can be spotted at a distance of 5 mi., nd radar beacons can be picked up at a range of 150 mi.

Allison believes that the combination of scope clarity of definition and minimum number of controls, contrasted with some wartime radars that have had more than 15 controls and switches to worry the operator, make his company's development acceptible to flight personnel.

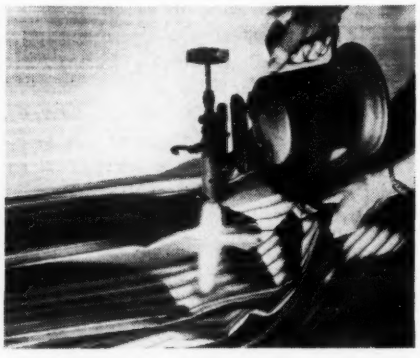
Preliminary overtures to domestic airlines have resulted in a wide display of interest, and Allison says that Southwest Airways has contracted for more than six units.

With CAA moving to require terrain clearance indictors on all transport craft, Allison engineers believe that even greater interest in the unit will be evidenced by airline operators, particularly since it not only scans for terrain clearance, but serves the double function of scanning ahead and above. Ease of maintenance, they point out, has been as important a factor as reducing weight throughout the design of the unit.

NEW AVIATION PRODUCTS

Resinous Flameproofer for Fabrics

Suitability for use on fabrics employed in aircraft is seen for new organic flameproofing compound, Antoxol, manufactured by **Eronel Industries**, 5714 W. Pico Blvd., Los Angeles. It is stated that this



product will not duct out or powder off because it is a balsamic resinous organic material. Moreover, maker reports compound will not alter color, appearance, sheen, or feel of fabrics, which can be dry cleaned repeated.

Foil-Core Honeycomb Sheeting

Common aluminum foil is integral part of new lightweight, strong, and rigid "Honeycomb" construction material announced by **The Glenn L. Martin Co.**, Baltimore 3, Md. Original "sandwich" material developed by company employed beehive cross-section core made of kraft paper or linen, usually impregnated with a plastic to give rigidity. New aluminum core is improvement, giving ease of handling and imperviousness to heat, cold, dampness, or water without additional protection. Moreover, cost of foil is low and supply is plentiful. To form "sandwich," sheets of metal, wood, plastic, or other semi-rigid material is bonded to core. Honeycomb is being used in Martin 2-0-2 and 3-0-3 aircraft as cabin flooring, for bulkheads and doors, and in the wings as supporting walls for bladder-type Mareng fuel cells.

Information Tips

Temperature, Pressure Control Devices

Industrial control devices for temperatures, pressures, flows, liquid levels, and humidity are illustrated, specified, and described in new 55-page catalog 8302 issued by **The Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co.**, Philadelphia 44.

Rivet, Dimpling, Cutting Tool Catalog

Aircraft Tools, Inc., 2306 E. 38th St., Los Angeles 11, Cal., is mailing 9th edition of its catalog, giving 134 pages of specifications, photos, and line drawings of complete line of tools, including rivet, dimpling, and cutting tools, angle drills, and bucking bars. Easy use of catalog is promoted by indexing tabs and also plastic spiral binding which allow pages to lie flat.

Air Travel Fundamentals

Titled, "How to Travel by Air and Gain Time, Time, Time," booklet being distributed nationally by **Glenn L. Martin Co.**, Baltimore 3, Md., gives the prospective first-time air traveler answers to his many questions. Q's and A's are colorfully illustrated with cartoons.

Propeller Brochure

Four-page color brochure on McCauley Met-L-Prop propeller has been issued by **McCauley Corp.**, 1840 Howell Ave., Dayton 7, Ohio. Company states new plant addition has been completed and that 1,000 props are being made monthly. Company's airscrew is optional equipment on Piper, Ercoupe, Aeronca, and Cessna craft.

Two Instrument Publications

"Kollsman Pressure and Temperature Gages" is 8-page folder on new line of aircraft gages offered by **Kollsman Instrument Div. of Square D. Co.**, Elmhurst, N. Y. Included are free air thermometers, fuel pressure, oil pressure, and landing gear oil pressure gages, engine thermometers, and carburetor air temperature gages. Also issued by company is new ready-reference catalog digest of postwar line of standard aircraft instruments. information is given on ranges, weights, and mounting requirements, of 18 separate types of flight and engine instruments.

Materials-Handling Tractors

Varied materials-handling uses of company's Shop-Mule tractors are illustrated in "Users List" booklet distributed by **W. F. Hebard & Co.**, 336 W. 37th St., Chicago 9. Besides tabulations of U. S. Army, Navy, and Canadian Government agencies employing these tractors, there are listings of 32 aviation manufacturers, 32 airlines, and 16 airports and air services.

How to Build Air Harbors

Edo Aircraft Corp., College Point, L. I., N. Y., is sending out its profusely illustrated "Air Harbors Data Book," containing practical how-to-do-it information for prospective seaplane base constructors. Featured is material on choosing a float base site, building ramps, docks, and seaplane marine railways, types of seaplane dollies, base accessories, and construction economies. The book draws on the valuable experience of operators who have pioneered these bases. Another recent publication by company is "Edo Floats Spell Profits," colorful spiral-bound sales presentation designed to aid distributors in work of setting up dealerships. Facts, figures, and policies of distribution program are graphically explained.

Explores Uses of Vinylite Coatings

Various new Vinylite plastic protective and packaging applications, meeting needs in the aviation industry, are being developed and explored by **R. M. Hollingshead Corp.**, Camden, N. J. This non-tacky, strippable, rust and corrosion preventing coating has been employed to "cocoon" some 1,400 Boeing B-29s for long-term outdoor storage, keeping them in ready condition for any future use which might arise.

Tips on Punch Care

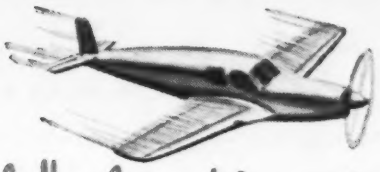
"Punch Pointers" is new "do's and dont's" booklet being mailed by **Allied Products Corp., Richard Bros. Div.**, 4640 Lawton Ave., Detroit 8. Illustrated with graphic cartoons, it features practical reminders on proper care and use of punches and dies.

For Fast Metal Fabrications

Coil-form nickel, chrome, copper, and brass steels, applicable for automatic manufacturing processes in the aviation industry, are publicized in folder available from **American Nickeloid Co.**, Peru, Ill. Coils come in widths up to 24 in. Samples of metals are included in folder.

Tells About Allcast

History, features, and recommended applications of Allcast aluminum alloy SC8, as well as latest data on mechanical and physical properties of metal, are included in revised booklet available from **The National Smelting Co.**, 6700 Grant Ave., Cleveland 5. Uses of Allcast in internal combustion engines, motor frames, and the like, are specified.



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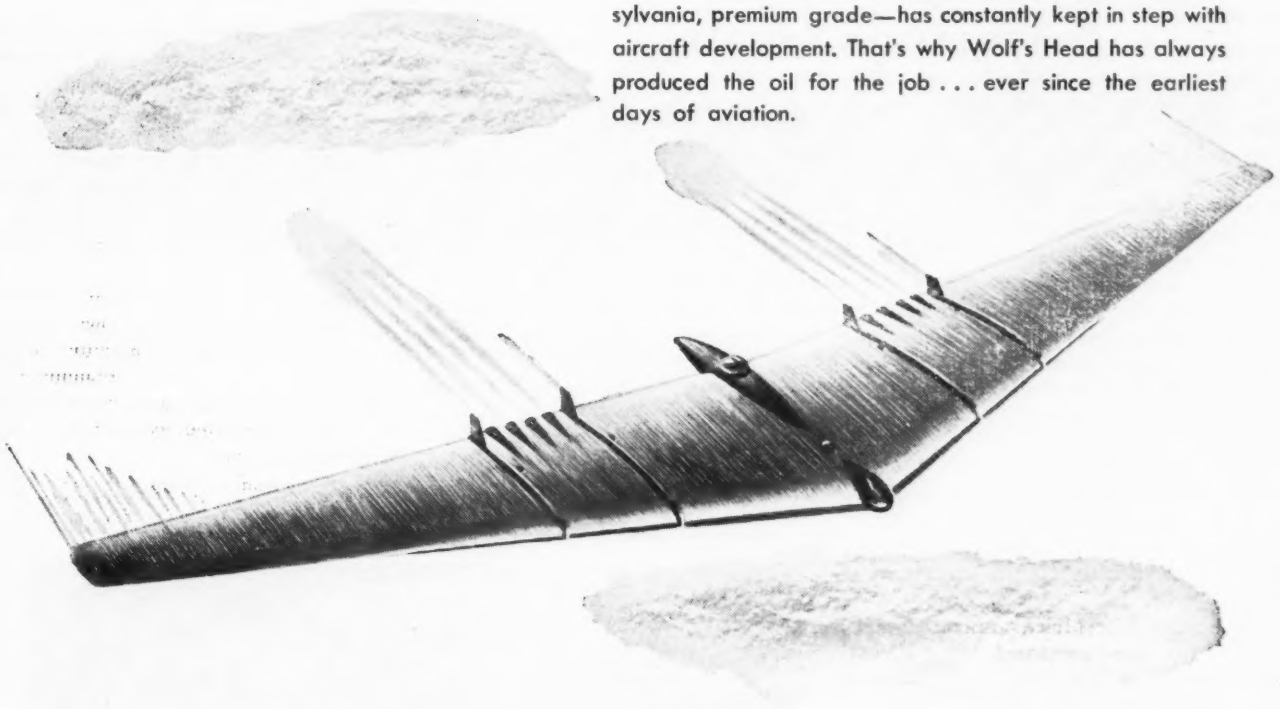

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P.G.C.O.A. Permit No. 6

Personal Plane Manufacturers Tighten Belts Against Dim Future

Sales manager changes, reduced production marks trend as industry prepares for hard winter.

By ALEXANDER McSURELY

Personal aircraft manufacturers are tightening their belts and preparing for a "long, cold winter," with dim prospects seen by most analysts for any large scale plane selling before next spring.

Actual production at most of the major producers' plants is probably at its lowest ebb since immediate postwar days with several plants shut down completely and most others on a limited production basis. Large inventories of planes at plants and in the hands of dealers and distributors made many models immediately available to buyers.

▶ **Piper Aircraft Corp.,** leader in 1946 personal plane production, is undergoing an economy reorganization following recent appointment of W. C. Schriver, former Chrysler Corp. official, as general manager. Walton B. St. John, sales manager, has left Piper, and Jake Miller, assistant sales manager, has been transferred to a field sales post in the middle west. T. E. Weld, vice president in charge of sales, is taking over the sales manager duties in consolidation with his own. Production which had been suspended for several weeks at the main Lock Haven plant was to have been resumed last week on a limited basis.

▶ **Aeronca Aircraft Corp.,** Middletown, Ohio, second largest producer, in 1946, was scheduled to resume production after a several weeks virtual shutdown, with production mainly concentrated on the company's order for Army liaison plane modifications of the Champion tandem trainer model.

Appointment of Floyd Simmen as general sales manager of Aeronca, replacing Robert Davidson, was a change resulting from Davidson's resignation for a leave of absence for personal reasons. Simmen was manager of sales regions for Aeronca, following his return to the corporation after serving as an AAF bomber pilot in the European and Mediterranean theaters, in World War II.

▶ **Republic Aviation Corp.,** was due to resume limited production on the Seabee amphibian following a company vacation early in August. Meanwhile Republic was meeting immediate customer demands from its stock of completed Seabees. Republic recently announced resignation of Gordon C. Sleeper. as sales manager for the Seabee, and appointment of Dan M. Parker, Jr., former Republic test pilot, to succeed him.

▶ **Beech Aircraft Corp.,** reported one of the brighter notes in the industry picture with announcement that the company had firm deposits for additional four-place Bonanzas, to insure continued production up to Sept. 20 at the rate of eight planes a day for five and a half days a week. On that date Beech plans to drop production to four planes a day. Beech is continuing to require 90 days advance deposits on planes, which makes it possible for the Wichita company to vary its production schedule according to customer demands without building up a large inventory of planes.

▶ **Stinson Division of Consolidated Vultee Corp.** announced plans following a recent dealers' meeting for curtailing production at the Wayne, Mich., plant in anticipation of a slackening of sales during the summer and fall.

▶ **Luscombe Airplane Corp.** is continuing in slow production at Dallas with a number of 65-hp. all-metal planes, waiting at the factory, ordered by dealers as trainers for the GI program but not yet accepted due to complications in contract renewals. Luscombe's 85 hp. planes are reported moving more rapidly.

▶ **Cessna Aircraft Co.** was reported in slow production at Wichita.

▶ **Engineering & Research Corp.'s** plant at Riverdale, Md. was shut down pending sale of Ercoupes now in inventory at the plant. Indications were for resumption of production on a slow basis, late in August, or whenever the inventory was reduced to a better working level.

▶ **Ryan Aeronautical Corp.** at San Diego,

TRANSFERRING NAVION

Arrival of first truck at San Diego with Navion fuselage, marked beginning of receipt by Ryan Aeronautical Corp. of physical properties included in recent purchase of four-place plane from North American Aviation. Transfer of tooling, spare parts and work-in-process by truck is described as one of biggest truck transportation jobs on West Coast since the war.

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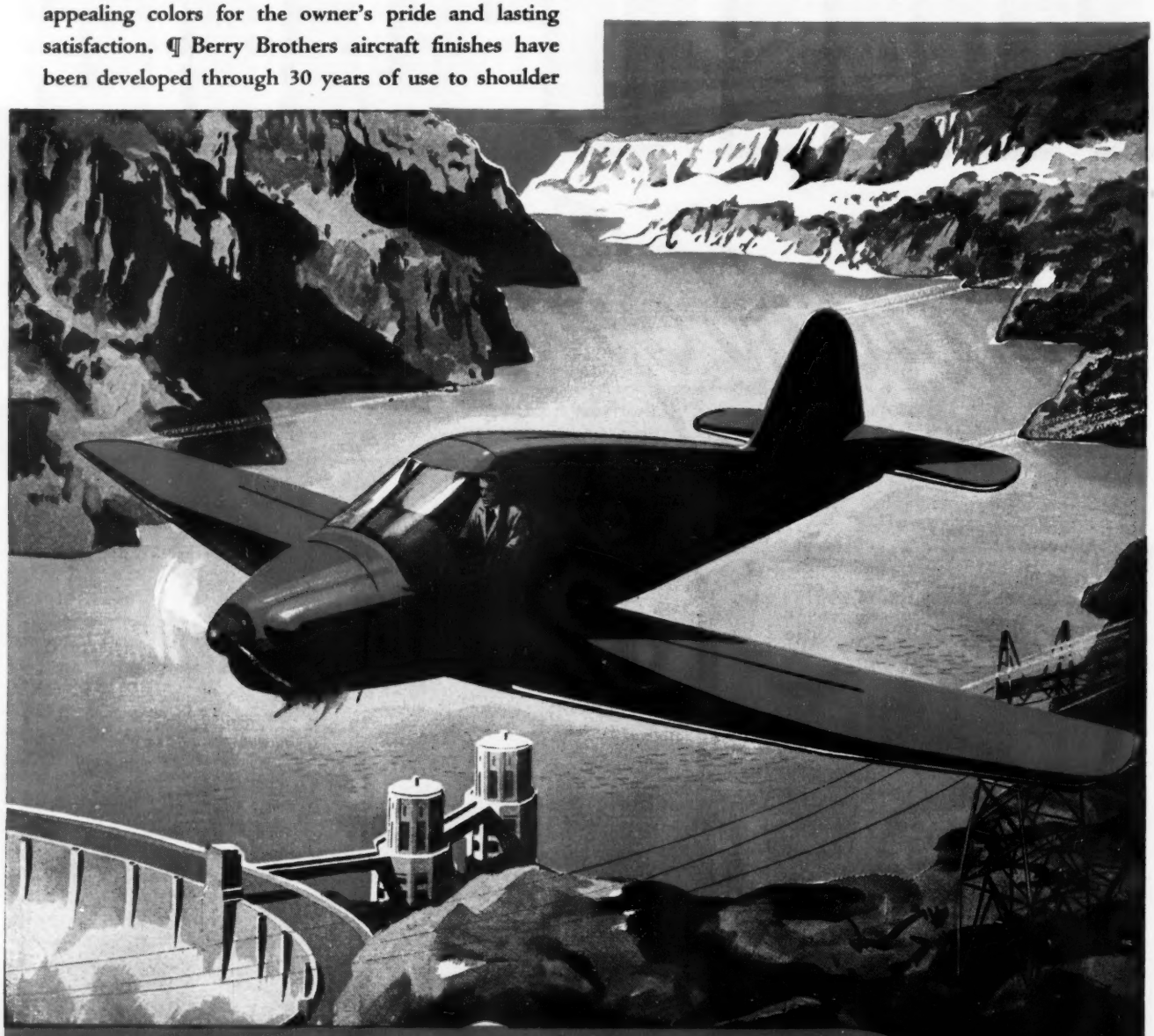

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and Texas Engineering & Manufacturing Company, Dallas, are not expected to produce in any sizeable quantities Navions and Swifts which they recently purchased, until existing inventories of the planes and planes in process are sold.

Manufacturers generally look forward eagerly to farmer plane buyers, who might use some of their harvest money for new airplanes, and to business plane buyers, for the bulk of their business in the next few months.

Feeling among airport operators is that flight training would probably continue largely with training planes already on hand rather than invest additional funds in new equipment, at a time when their own plane sales are slow. Reports of a slowdown in maintenance and repair business on airplanes now in the field were received last week from a competent observer who recently made a trip through southern and eastern airports. There are some indications that this slowdown extends over other regions also.

While most of the companies' sales departments are anxiously striving to develop export business, the difficulties involved in dollar exchange and the relatively small number of customers in most European countries who can afford to import American planes sets a fairly tight limit on the percentage of business that can be found abroad.

▶ **Survival Chances**—Analysis of the personal plane market indicates that the industry is "going through the wringer" as a result of over-expansion in the immediate postwar period and over-production without, in many cases, firm orders for the planes produced.

Present indications are that most of the companies will survive the "wringer" but will be much contracted and will produce on a much smaller scale. How the stringent conditions they are undergoing now will affect development of future personal planes to take the place of the ones now being manufactured may be one of the most serious consequences. Presumably research and development for new prototypes will be hampered as much as other phases of the business by the economies that are being forcibly introduced.

Bell Aircraft Expands 'Copter Mechanics Course

Bell Aircraft Corp. has expanded its helicopter mechanics training course from two to five weeks and will henceforth accept qualified "free lance" students. Previously, only company and customer personnel had been admitted. An A&E license, is still required for enrollment.

The first two weeks of the course are devoted to assembly, disassembly, balancing and rigging instruction; the second two weeks includes preparation of the helicopter for the 100-hr. and 300-hr., inspections.

Airport Survey

Approximately 60 percent of all airports in operation are Class I and under, those most suitable for private flying, according to CAA statistics as of July 1. Of a total of 5,251 fields, 3,160 are in that cageory.

During the month, the number of airports in operation rose from 5,074 on June 1, a gain of 177. While commercial fields showed a gain of 129, military fields decreased by 61, and CAA intermediate fields by four. Registered aircraft on July 1 numbered 93,920, of which 902 were used by scheduled air carriers.

Airport and aircraft picture for June and July:

	July 1	June 1
Airports in operation	5,251	5,074
Commercial	2,512	2,383
Municipal	1,672	1,612
CAA Intermediate	185	189
Military	599	660
All others	283	230
Airports by Class:		
Class I and under	3,160	3,009
Class II	828	815
Class III	512	498
Class IV and over	751	754
Total Registered Aircraft	93,920	92,348
Scheduled Air Carrier Aircraft	902	888

Flying Farmers Hold Second Convention

Second annual convention of the National Flying Farmers Association will convene at Stillwater, Okla., the end of this week, Aug. 7, for a three-day meeting that will feature a flying tour of ranches in the state and a short course in crop dusting, aerial seeding, spraying and fertilizing, and other farm operations.

Meetings will be held at Oklahoma A. & M. College, while flight activities will be concentrated at Stillwater municipal airport. Among awards to be given during the convention will be for the most outstanding contribution to rural aviation, for the county that has the largest number of farm flyers in attendance, and for the farm family in attendance that has the largest number of pilots.

In advance of the national convention, a number of state flying farmer organizations have held meetings:

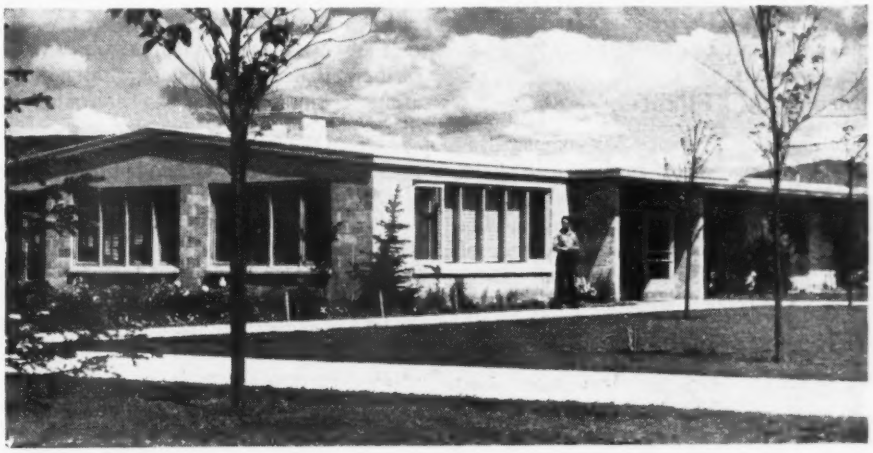
▶ **Ohio**—More than 240 attended the second annual meeting and field day at Don Scott Field near Columbus and elected new officers. Myron C. Baker is president, Clifford E. Gibbs, vice-president, and William Gary Fox, secretary-treasurer. Ray T. Kelsey continues as executive secretary. It was decided to put in a bid for the 1948 national convention.

▶ **Wisconsin**—First state-wide meeting was held at Marshfield with about 100 members and 36 planes. Directors, who will elect the officers, are: Bert Hurlburt; John O'Laughlin; L. C. Powell; Oscar Dingman; Thomas Tracy; Herbert King; Kenneth McClain; and Mrs.Elgin Herbeck.

▶ **Missouri**—Organizational meeting at Moberly was attended by 52 persons.

▶ **Michigan**—At a one-day meeting at Lansing, flying farmers deferred action on the question of affiliating with the national organization, leaving the matter for decision of the board of directors. The convention, attended by 150 in 60 planes, reelected Lee Talladay president. Other officers are: V. S. Spencer, vice-president; Earl Gehman, secretary treasurer; and Albert H. Crane, Earl Williams, Wilber Gruner, D. M. Shinabery, and Raymond Wheeler, directors.

Honorary memberships were conferred on Gov. Kim Sigler; William B. Stout, chairman of of the state aeronautics commission; Col. Floyd E. Evans, director of the department of aeronautics, and others.



SKYTEL ACCOMMODATES FLYING TOURISTS

At Bradley Field, Boise, Idaho, touring flyers find this new comfortable, modernistic Skytel, offering accommodations which may bring itinerant pilots out of their way to spend the night. The 13 unit lodging house, and an adjoining restaurant are operated by Phil Cox.

Airborne Parts Speed Kansas Wheat Harvest

The supply of vital spare parts, servicemen and repairs for combines during the Kansas spring wheat harvest last month provided a demonstration of another unique and invaluable service of the personal airplane. Three Cessnas, operated by Paul Radkee of Liberal, Kansas, averaged about nine trips a day during the harvest supplying parts directly to the scene of the breakdown.

Radkee, owner of the Liberal Aircraft Co., formulated the plan several weeks before harvest time and advertised in several Kansas newspapers: "In the event of a breakdown during harvest operations, save time and money by having replacement parts flown directly to your field by the Liberal Aircraft Co., Liberal, Kansas." At the same time Radkee conferred with farm equipment dealers in the area and enlisted their aid in the plan. When harvest got under way the farmer called Liberal Aircraft Co., described the part needed and Radkee did the rest, finding the right dealer with the right part and flying it directly to the farmer's field.

Radkee has also flown farmers over their land to plan more accurate contour plowing, and has carried automobile dealers to distribution points to pick up new cars.

Airport Lectures

A five-day series of lectures and exhibits covering nearly every phase of airport development and operation is being held Aug. 18-22 at the University of California School of Aeronautics, with the program put together primarily to appeal to airport owners and administrative personnel. CAA's Sixth Region is cooperating in the presentation of the short courses, and several CAA officials will be among the speakers.

Topics to be discussed in lectures running from 30 min. to an hour include: design, planning, development, zoning, insurance sources of revenue, leases, safety, and public relations.

Record Cub Flight

A Piper Cub seaplane has completed an 1100-mile solo flight from Round Lake, N. Y. to Corner Brook, Newfoundland, piloted by Lee Wulff, who took his first flying lesson just five weeks prior to the flight. The Edo float-equipped, 65-hp. Piper Cub Trainer covered the distance in 11 hr. 25 min. flying time and the trip took four days in leisurely stages, including overnight stops on small lakes along the route. Wulff, who has spent most of his life hunting and fishing in Newfoundland, purchased the Cub last Spring to facilitate his writing and photography through the area. He carried five-gal. fuel cans and refueled along the route by dropping down to lakes when required.

BRIEFING FOR DEALERS AND DISTRIBUTORS

NEW ADMA MEMBERS—Fifteen new members of the Aviation Distributors and Manufacturers Association have been added since the midwinter Chicago ADMA meeting, Richard N. Bomberger, vice-president of Sensenich Corp., Lancaster, Pa., and ADMA membership chairman, has announced. New distributor members: Inter City Aviation, Inc., Logan Airport, Boston, Mass.; Buffalo Aeronautical Corp., Buffalo (N. Y.) Municipal Airport; Piedmont Aviation, Inc., Winston Salem, N. C.; Berner-Pease, Miami, Fla.; Northwest Aircraft Distributing Co., Vancouver, Wash.; Muncie Aviation Corp., Muncie, Ind.; Aviation Division, Illinois Auto Electric Co., Chicago; S. A. Long Co., Inc., Wichita; Eastern Airmotive Corp., Byrd Airport, Richmond, Va.; Western Skyways Service, Portland, Ore. New manufacturer members: Flightex Fabrics, Inc., New York; Weems System of Navigation, Annapolis, Md.; Electric Auto-Lite Co., Toledo, Ohio; Flottorp Manufacturing Co., Grand Rapids, Mich., and Aircraft Hardware Mfg. Co., New York. Total association membership now stands at 84 companies.

OPERATION AT ERCOUPE FIELD—Sanders Aviation, Inc., is taking space in a building at Ercoupe Field, Riverdale, Md., where it will serve as Ercoupe distributor for the District of Columbia, Virginia, Maryland area, and will also operate a repair and service base for transients using the field. Bob Sanders, head of the new operation, succeeds W. L. (Jack) Nelson, as distributor in the area. Sanders previously had been associated with Engineering & Research in charge of their service department. Nelson, formerly in the CAA War Training Service, and later secretary to the CAA Non-scheduled Flying Advisory Committee, has accepted a banking position in Texas. The new Sanders organization provides for the first time a complete service operation at the Ercoupe field, in addition to a sales organization.

SKYWAY NO. 1—First of what is expected to be a series of national airways for personal planes is now being planned through co-sponsorship of the Los Angeles Chamber of Commerce, and Washington (D. C.) Board of Trade, and will run between the two cities, in a 40-mi. wide aerial transcontinental route, designated as Skyway No. 1. Tentative route will run east from Los Angeles through Arizona and Texas, with a northern branch going through Oklahoma, Missouri, Indiana, Ohio and Pennsylvania, and a southern route, which turns north—near the east coast, via Atlanta. Cooperation of the Personal Aircraft Council and the CAA has already been enlisted for the project, which could develop eventually into a huge national network of private flyer skyways, with feeder routes set up in various states by alert state aeronautics departments. The route will be thoroughly airmarked with special signs designating it as Skyway No. 1, and will be surveyed to insure that it provides plenty of good airports and overnight accommodations at easy intervals along the way. C. S. Beesemeyer, Los Angeles Chamber of Commerce president, has offered the use of his new Beech Bonanza for one of the survey flights. Complete information on hotels and airports will be made available enroute to flyers using the new Skyway. Airports which find themselves included in the Skyway route or in other routes which may follow in the future, will have a considerable advantage in the amount of "through" plane traffic which the route is expected to generate.

PILOT CERTIFICATES—An amendment to Civil Air Regulations, Sub-section 20.55, greatly simplifies the predicament of pilots who failed to renew their private or commercial certificates before the recent expiration date July 1. A CAB statement accompanying the amendment points out that pilot competency is not involved in the exchange of certificates so that the pilots should be permitted to apply to the Administrator for reissuance of certificates, without examination or flight test. The regulation states: Any person who on June 30, 1947 held a valid private or commercial certificate and who failed to exchange such certificate . . . . may not withstanding such failure and without other showing, obtain a pilot certificate with appropriate ratings upon application to the Administrator.

ADEQUATE MARGINS—The old question of how much is an adequate margin of profit for the distributor came up for another discussion at the recent ADMA mid-summer meeting at Mackinac, with Ray Snyder, president of Snyder Aircraft Corp., Chciago, citing results of an Association study on the costs of an aviation parts, supplies and equipment distributor organization. On the basis of this study, costs have been running between 24 and 25 percent, Snyder said, with an inventory turnover about four times a year. Total gross profit earned by most distributors averaged 27½ percent in 1945 and 1946, while a recent survey indicates the gross margin has dropped 2½ percent in the last year (July 1946-June 1947). Snyder points out that the number of distributors of aviation equipment has grown from approximately 50 in 1943-4 to more than 200, who handle several different products and lines. The reduced margin is mostly attributable, he believes, to manufacturers who attempt to reduce prices yet hold up their own prices to the distributors, who eliminate the volume discount, or who recommend discount schedules that do not permit enough margin to cover operation cost. Snyder concludes: "there are too many easier ways to make a living, and there is just no sense in batting one's head against a stone wall if the vendors will not admit the necessity of the distributor's making an adequate profit."

—ALEXANDER McSURELY

The pumps which supply gasoline to the engines, that feather the propellers, or operate the landing gear of a huge transport may seem far removed from the pump which raises and lowers the platform of the industrial truck used in loading and unloading it, but they aren't . . . for they both utilize *Pesco Pressurized Power.*

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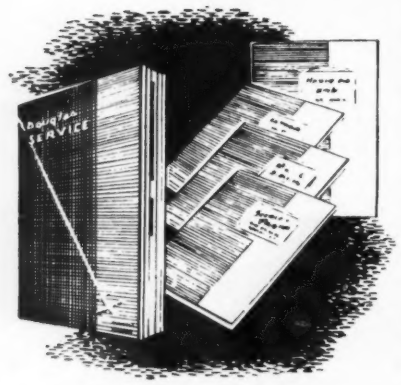

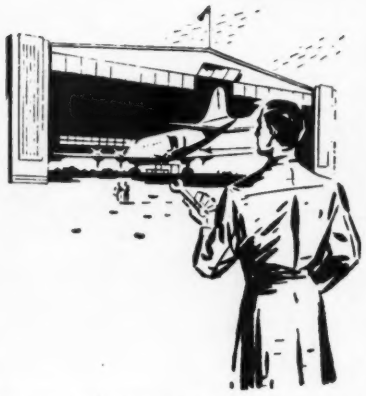

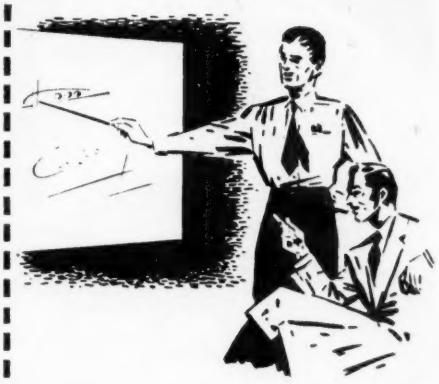

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MORE PEOPLE FLY MORE PLACES BY DOUGLAS

U. S. Carriers Operating 61% Of All Scheduled Plane Miles

Cab survey shows five American companies flying more mileage per week than any foreign line; margin of supremacy is narrowing.

By CHARLES ADAMS

More than 61 percent of all plane miles scheduled each week by the world's common carrier airlines are flown by American operators, but the huge margin of commercial aviation supremacy which the U. S. had early in 1946 is narrowing.

A survey made by CAB's Economic Bureau shows that 47 scheduled U. S. airlines, including 18 Alaskan carriers, were flying 7,607,000 plane miles weekly as of April 1, 1947. In contrast, 140 foreign lines (excluding carriers in Russia, Hungary and Rumania) were operating 4,817,000 plane miles weekly.

► **Breakdown Given** – Of this country's 7,607,000 weekly plane mile total April 1, 6,135,000 were being flown domestically and 1,472,000 internationally. U. S. domestic weekly plane mileage increased from 4,947,000 March 1, 1946, to 6,691,000 Oct. 1, 1946, but fell back to 6,135,000 by April 1 of this year partly because of seasonal variations and partly because of a retrenchment due to a traffic slump. U. S. international carriers boosted their weekly plane mileage from 961,000 on March 1, 1946, to 1,213,000 Oct. 1, 1946, and 1,472,000 April 1, 1947.

Foreign operators' scheduled plane miles rose from 3,037,000 per week March 1, 1946, to 4,436,000 Oct. 1, 1946, and 4,817,000 April 1, 1947. Total weekly plane mileage for the world increased from 8,945,000 in March, 1946, to 12,424,000 April 1, 1947. During this period, the U. S. share of the total decreased from 66 percent to slightly over 61 percent.

► **U. S. Carriers Largest**—Of the 26 scheduled common carrier airlines in the world operating more than 100,000 plane miles weekly, 15 are U. S. companies. American Airlines, which flew 1,202,817 plane miles weekly (1,161,517 domestically and 41,300 on its Mexican run), was the largest operator on April 1, 1947.

The next four ranking carriers also were U. S. companies—United, 1,144,835 plane miles weekly; Pan American, 980,290; TWA, 954,132 (836,244 domestic and 117,888 foreign); and Eastern, 925,723 (911,709 domestic and 14,014 to Puerto Rico). In sixth place was the largest foreign airline, BOAC, which scheduled 409,048 plane miles weekly as of April 1.

► **Trans-Canada Seventh**—Seventh to 15th in size on a weekly plane mile basis were Trans-Canada Air Lines, 366,227; Northwest Airlines, 358,646; Capital Airlines (PCA), 291,425; Air France, 286,948, Australian National Airways, 262,434; Delta Air Lines, 225,064; National Airlines, 209,594; Braniff Airways, 209,207, and KLM, 203,181. Other carriers scheduling more than 100,000 plane miles weekly on April 1 were, in order of rank, British European Airways, Western Air Lines, Chicago & Southern Air Lines, Compania Mexicana de Aviacion (Mexico), American Overseas Airlines, South African Airways, Panagra, Avianca (Colombia), Cruzeiro (Brazil), Panair Do Brasil, and Mid-Continent Airlines.

Largest active route system in the world on April 1, 1947, belonged to Air France, which had an unduplicated mileage of 57,814. BOAC was second with 45,846 miles.

Latest figures for U. S. carriers showed PAA with the largest active network as of December, 1946—39,072 miles. TWA was in second place with 20,424.

Super Service

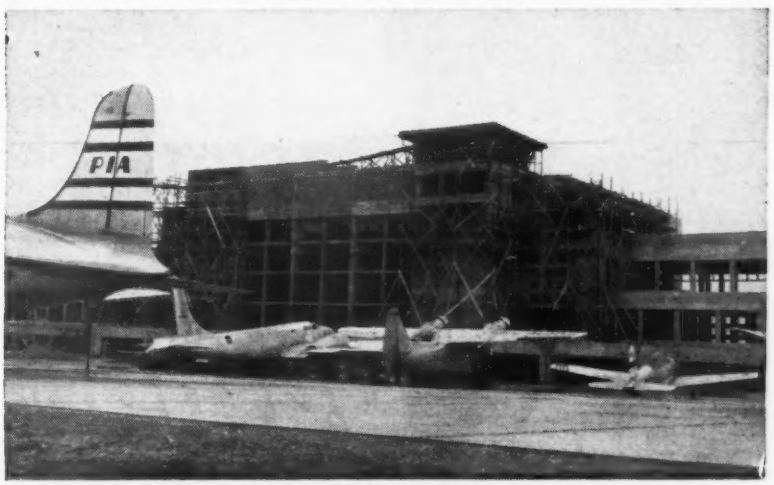
United Air Lines has launched an intensive campaign to make regular passengers of customers taking their first plane trip.

As part of its program, United is stamping the figure "1" on all tickets purchased by "first flighters." Every UAL employe handling these marked pasteboards has been asked to devote extra time and interests to their holders. Stewardesses, particularly, have been requested to answer any and all questions which the new passenger may pose and to point out interesting spots along the airway.

UAL states the plan is effective but has not disclosed whether any veteran air travelers have been noticed making every ride a first trip to obtain super service.

Colonial Seeks Extensions

Colonial Airlines, which this month inaugurated its routes from Washington and New York to Bermuda, has asked CAB for authority to operate additional links from Boston and Philadelphia to Bermuda. The carrier also wants to extend its present Bermuda routes to Miami via Nassau, Bahamas, and to extend its Montreal-New York service to Miami via Philadelphia, Baltimore, Washington, Charleston and Jacksonville.



EXPANSION AT LIMA

Limatambo Airport, home base of Peruvian International Airways, soon will have one of largest and best-equipped administration buildings in the world. Structure shown above originally was to be completed early this year, but steel shortage has delayed work. Peruvian International, headed by Harold L. George, formerly lieutenant general in charge of Air Transport Command, is now operating twice weekly between Lima and Havana with DC-4s. Carrier plans to extend its routes north to Washington, New York and Montreal, and south to Santiago, Chile. (McGraw-Hill World News photo)

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CAB Blames Pilot For AOA Accident

CAB's investigation of the accident in which an American Overseas Airlines DC-4 crashed against a mountain ridge shortly after taking off from Stephenville, Newfoundland, last Oct. 3 has found pilot error to be the probable cause and has absolved CAA of blame.

The board's report said the AOA pilot was at fault in maintaining the direction of takeoff toward high terrain over which adequate clearance could not be gained and stated that the captain was not alert to the procedure necessary for a safe climb from his runway. CAB also disclosed that neither CAA nor the airline had placed restrictions on the use of runways for takeoff at Harmon Field and that no special procedures had been established for climbing to cruising altitude.

▶ **Data Available**—"Navigational data carried in the cockpit of the DC-4 adequately described the terrain in the vicinity of Harmon Field, and all the information necessary to permit the pilot to determine a climb procedure which would avoid obstructions in the direction of takeoff was available to him," the report asserted. It added that the Army's Air Transport Command had restricted use of Runway 7 (from which the DC-4 took off) and said it was general practice for flights utilizing that runway to make a right turn shortly after takeoff to avoid high terrain.

Worst crash in the history of U. S. commercial aviation until that time, the AOA accident, in which all 39 aboard the plane were killed, had been seized upon by Sen. Pat McCarran (D., Nev.) to blister CAA-CAB safety policies. McCarran, who favors an independent air safety board, charged (AVIATION NEWS, April 7) that CAB's investigation of the mishap was "perfunctory" at the scene of the crash and that subsequent questioning of witnesses was incomplete, avoided embarrassing questions, and failed to determine where CAB regulations and CAA enforcement procedures were faulty.

▶ **McCarran's Prediction**—In a letter introduced before the Senate's air safety subcommittee last March, McCarran had stated there was indication that CAB might attempt to pin responsibility on the dead pilot "for apparently forgetting the mountain was there." He said there was conflicting testimony as to whether CAA inspectors had actually inspected the Stephenville airport prior to the crash or had relied entirely on information provided by American Overseas Airlines.

Prior to investigation of the AOA accident, requirements of the Civil Air Regulations with respect to airline operations, and application by CAA of transport category rules, had been regarded as providing adequate coverage of terrain clearance in the immediate vicinity of the airport during and following takeoff, CAB stated. Part 41 of the Civil Air Regulations requires that takeoffs be made only from such airports, in such directions, and under such weight limitations that, in the event of failure of one engine, a vertical clearance of at least 50 ft. will be assured in the subsequent flight on the remaining engines.

▶ **CAA Surveys Limited**—"Since the application of these limitations is dependent upon peculiarities of terrain which differ for each airport and therefore make impracticable uniform regulatory treatment, determination of the extent of area within which these regulations shall be applied is left to the discretion of CAA. In practice, CAA has confined its surveys to an area within approximately three miles of the airport.

"Engineering data submitted by AOA to CAA with respect to Harmon Field was reviewed in the accident investigations, and it was apparent that the high terrain into which (the DC-4) crashed lay beyond the area normally surveyed for the purpose of airport approval. Since a 3-mile radius from the center of the airport provides ample room for aircraft to maneuver to avoid obstructions lying beyond that distance, (CAA's) approval of operations at Harmon Field appeared to be appropriate."

▶ **Distance of Ridge**—The unlighted ridge which the AOA plane hit at an altitude of 1,160 ft. shortly after the pre-dawn takeoff is seven miles from the end of Runway 7.

CAB said that while the Civil Air Regulations are not intended to regulate all details of air transportation, and, therefore, have not specifically required that climb procedures be established at such airports as Harmon Field, "some regulatory direction may be required in instances such as this." The board in May circulated proposed regulations requiring air carriers to define clearly the procedures for climb from each airport where terrain or other obstructions in the vicinity present a hazard to flights at night or under instrument conditions.

SNACK BAR

United Air Lines is providing a between-meal treat for passengers on its DC-6s flying between San Francisco and Honolulu. Snack bar features various types of salads, cold meats, stuffed deviled eggs, relishes, stuffed celery, olives, artichokes, tomatoes, avocados and other delicacies.

June Traffic Slump Causes PCA Deficit

After two successive months of profitable operations, Capital Airlines (PCA) slipped into the red again during June as the result of lower passenger load factors which President C. Bedell Monro attributes to the recent series of DC-4 accidents.

Historically, PCA's June passenger revenue has been higher than in May. But this year, because of the crashes, the carrier's load factor slumped from 59.73 percent in May to 50.06 percent in June. Operating profit, which was $48,003 in April and $77,867 ($42,000 net) in May, turned into a $200,000 net loss in June.

Passenger revenue during June was $240,000 under May, but the carrier was successful in reducing its breakeven load factor to a new low of 57.5 percent. PCA suffered a net operating deficit of $2,215,000 in the first quarter of 1947.

Despite the losses, PCA's cash position improved substantially during the first six months of the year. On Jan. 31, the carrier had cash and securities totaling $2,199,000 against current accounts payable of $2,167,000. By June 30, PCA's cash and securities had increased to $2,640,000, up $441,000.

Domestic, Overseas Lines Operating 888 Aircraft

Number of aircraft operated by U. S. domestic and international carriers reached a new peak in June, with the airlines' DC-3 workhorse still the most common type of commercial transport plane.

CAB statistics show 888 planes used by scheduled American carriers in June, 1947, compared with 687 in June, 1946; 419 in June, 1945; 294 in June, 1944; and 256 in June, 1943, when much of the airlines' equipment had been requisitioned by the armed services. DC-3s totaled 518 in June, 1947, against 503 in June, 1946, and 366 in June, 1945.

Douglas DC-4s, which were not used in scheduled commercial air transportation in June, 1945, numbered 106 in June, 1946, and 257 by June of this year. DC-6s, which made their initial appearance early this spring, numbered 28 by June; while Lockheed Constellations increased from 34 in June, 1946, to 52 in June, 1947.

Other planes flying on U. S. airlines this June included 12 Lockheed Lodestars (against 15 in June, 1946), 4 Boeing 247ds (Empire Air Lines), 5 Boeing 307 Stratoliners, 7 Stinsons and 5 Beechcraft.

Cohu Nips Rumor

TWA president LaMotte T. Cohu has denied flatly rumors that his company plans to move its headquarters from Kansas City. He told business and civic officials recently that TWA is in Kansas City to stay, adding that "it is a matter of pure economics which will hold us here."

● AN ANNOUNCEMENT TO THE

Aviation Industry

BY

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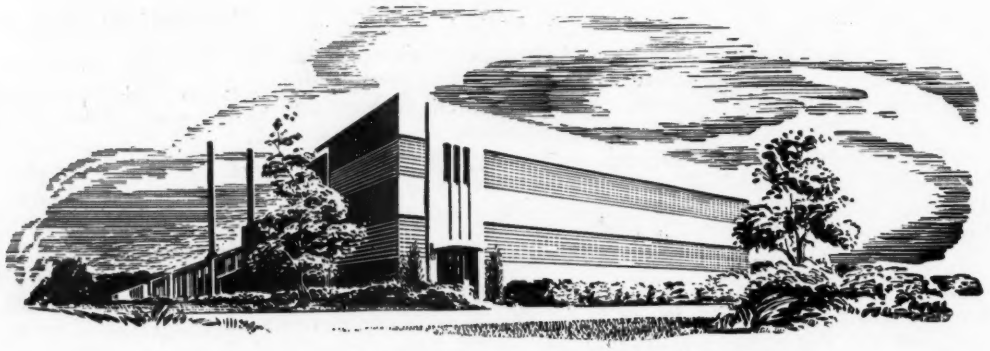

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Domestic Carriers Show Profit in May

Led by the industry's "Big Four"—American, Eastern, TWA and United—the domestic trunklines showed their largest monthly profit of 1947 during May.

The carriers as a group had moved into the black for the first time this year in April, largely because of Eastern's earnings (AVIATION WEEK, July 7). But May was the first 1947 month in which the majority of the 16 lines showed a profit.

► **Earnings Listed**—With American displacing Eastern as profit leader, the industry's net operating income rose from $393,315 in April to $2,301,065 in May. American earned $772,635, Braniff $27,480, Delta $27,239, Eastern $691,159, Inland 35,026, Mid-Continent $11,927, Capital (PCA) $27,239, Eastern $691,159, Inland $35,026, and Western $121,110.

Deficits during May were experienced by Chicago & Southern $9,321, Colonial $66,816, Continental $15,433, National $27,544, Northeast $106,983 and Northwest $25,197. By contrast, nine of the 16 carriers showed operating losses for April.

Despite profitable operations during April and May, the domestic lines were still far in the red for the year because of the unprecedented $18,746,184 deficit during the first quarter. Aggregate loss for the first five months of 1947 is $16,051,804, against a $1,776,000 deficit for the same period in 1946, worst year financially in U. S. commercial aviation history.

► **Transatlantic Carriers**—Meanwhile, U. S. flag carriers on the Trans-Atlantic run also made their best showing of the year during May. American Overseas Airlines reported $258,617 operating income and a 90.73 percent load factor for the month; Pan American Airways (Atlantic Division) had a $396,129 operating profit and 78.05 percent load factor; and TWA earned $19,581 on an 83.11 percent load factor.

United showed a $68,770 operating profit and 88.18 percent load factor on its San Francisco-Honolulu route during May, first month of operation for the service. Of the seven feeders active in May, Pioneer was the only one in the black.

Air Cruises Planned

American International Airways, Inc., New York, plans to inaugurate a program of 12-day air cruises from New York to Miami, Havana, Nassau and Bermuda this month. The uncertificated carrier will use four-engine, war surplus Boeing 314 flying boats accommodating 60 passengers.

Irish Postpone Service

Irish Airlines, which had planned to start twice-weekly Constellation service from Shannon to New York this fall, has postponed inauguration of trans-Atlantic operations until next Spring.

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Uncertificated Lines Testing CAB Policy

Two cases recently placed before CAB will go far toward determining whether uncertificated passenger-carrying operators using airline-type equipment have a legitimate place in air transportation.

In its revision of the nonscheduled exemption (Section 292.1 of the Economic Regulations) last May, CAB stated flatly that there was a need for operators who could meet requirements for service arising from special conditions. Whether in actual practice the Board is willing and able to move fast enough to permit such special service will be shown by its action on the requests of Resort Airlines, Pinehurst, N. C., and Transair, Inc., New York, for short-term exemptions authorizing scheduled common carrier operations without a certificate.

▶ **Opposition Expected** – Regularly-scheduled carriers, which are actively opposing Resort Airlines' bid for certification of its all-expense air tours, are also expected to fight "competition by exemption." Complicating the first test cases is the late date on which both operators asked for exemption. Resort filed only after its summer air tour program had begun, while Transair's application was received by CAB just three weeks before the date when the exemption would be made effective, if granted.

Unless CAB issues Resort Airlines a special exemption in the near future, that uncertificated carrier's unique program of all-expense "Skycruises" may have to be discontinued. The North Carolina operator states it has been advised by the Board's enforcement and litigation section that its DC-3 air tours have a regularity in excess of that permitted by Section 292.1.

▶ **Threat to Future**–Replying to CAB, Resort declared it would be forced to suspend operations, sell a substantial part of its aircraft, release employes and suffer disintegration of its present organization unless the Board issues an order authorizing completion of the remaining trips scheduled this summer. The carrier's advertised summer program includes 16-day roundtrip transcontinental tours leaving New York, Cleveland and Chicago on eight of the nine Sundays in July and August.

Pan American Airways, National Airlines, United Air Lines and TWA already have asked CAB permission to intervene in opposition to Resort Airlines' application for a permanent certificate (AVIATION NEWS, June 30). National said a large part of its traffic is of vacation and resort nature and that approval of Resort Airlines' certificate request "would result in substantial diversion of revenues."

▶ **Eyes Interstate Traffic**–Transair is seeking an exemption order which will permit carriage of interstate as well as intrastate passengers on the temporary operation which it plans to conduct between New York City and Saratoga Springs, N. Y., every day during the Saratoga horse racing season, Aug. 4-30. The company, which operated the same link on an intrastate basis during 1946, said it did not want to incur the ill-will of its customers by having to screen them all to determine which few originated in nearby New Jersey or some other state.

Nearest stop to Saratoga Springs on a certificated airline route is 30 miles, Transair told CAB. The carrier asserted the proposed operation presents a special type of service which can be performed more adequately by uncertificated irregular operators than by certificated lines. It added that the service represents the type which the Board had in mind when it outlined the place of irregular air carriers in air transportation two months ago. Transair has available airline-type equipment for the Saratoga Springs run, including one C-54 still under conversion, two DC-3s, one Lockheed Lodestar, two Lockheed Electras and a Lockheed 12A.

▶ **Board's Position**–CAB's latest revision of the nonscheduled exemption stated that "there are probably certain types of services which lend themselves to uncertificated air carrier operations and yet, due to their very nature, might tend to be conducted with a regularity in excess of that permitted by Section 292.1. Such might be the case with so-called 'air tours' or all-expense tours

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conducted each weekend to some resort region."

The Board then issues an invitation to this type of operator to apply for a certificate or an appropriate exemption—action which both Resort Airlines and Transair have now taken.

Other industry developments:

• **Amphibian Air Transport,** Long Beach, Cal., has asked CAB for a certificate authorizing carriage of passengers and property from Los Angeles, Burbank and Long Beach to Avalon, Catalina Island. Company is flying the route with four Grumman amphibians.

• **Robinson Airlines,** Ithaca, N. Y., recently completed its four millionth passenger mile without an accident.

• **Northern Airlines,** Seattle, has begun DC-3 cargo service to Mexico City via Salt Lake City and San Antonio.

• **Mt. McKinley Airways,** Anchorage, recently started connecting nonscheduled freight and passenger service to New York and Chicago in cooperation with two other uncertificated carriers, which are to meet the Alaskan operator's planes at Seattle.

• **Rogue Air Transport,** North Bend, Ore., has been organized to conduct airfreight service to Chicago, New York, St. Louis and other points with a DC-3.

• **Bay Valley Air Service, Inc.,** San Francisco, was slated to begin "commuter" service between San Francisco, Sacramento, Stockton and Modesto early this month with Grumman Goose amphibians.

• **Anacortes Airways,** Anacortes, Wash., has inaugurated daily service to Seattle with Republic Seabee equipment.

• **U. S. Airlines,** St. Petersburg, Fla., is opening new cargo service from Teterboro, N. J., to Havana, Cuba.

Airlines Still Plagued By No-Show Problem

The airlines' current no-show problem apparently is almost as serious as it was last summer when the carriers agreed to institute penalties against passengers who failed to cancel unwanted space on which reservations had been made.

TWA states that in the face of present spirited competition for passengers the penalty system has weakened "almost to the point of collapse." At a recent ATA meeting on the problem, it was determined that no-shows fall into three main classifications: those who fail to make connections between one airline and another on an interline ticket; roundtrip and stop-over passengers who fail to leave a contact number with the airline at their stop-over or turn-around point, and local passengers who fail to show up at the originating station.

During the first eight days of July no-shows on TWA's routes became so numerous that the carrier tagged them as one of its most serious problems. TWA will conduct an advertising and publicity program to combat the situation.

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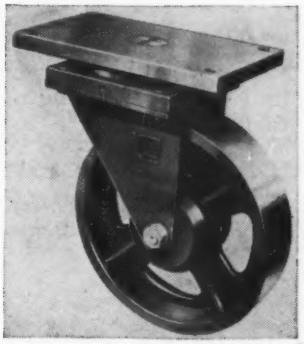

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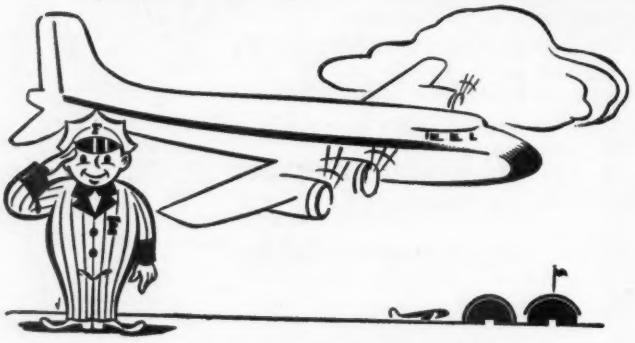

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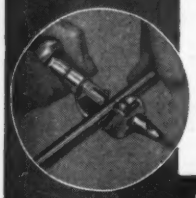

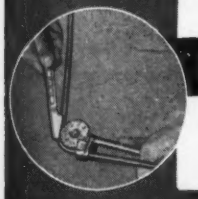

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Feederlines Plead For More Mileage

Trend towards expansion reflected in applications awaiting CAB action.

Expansionism has a firm grip on the certificated feederlines despite the fact that only one local carrier has been operating for more than a year.

Of the seven feeders now flying, the oldest has already been successful in greatly enlarging its system, and five more have bids for important route extensions pending. Two other local carriers which have not yet started operations—Wiggins Airways and Wisconsin Central Airlines—also have asked for more mileage.

► **Trunkline Comment**—Many trunkline officials—a number of whom have always viewed feeders with skepticism—several years ago forecast development of a fever for expansion among would-be local operators once they were certificated.

The feeders justify their ambitions by pointing out that their systems are, without exception, considerably, smaller than those originally applied for. They state that more mileage is needed to spread costs and boost equipment utilization and argue that additional links are required to anchor their systems at natural traffic terminals rather than arbitrarily chosen points.

► **Pioneer's Growth**—If all the new routes applied for were granted, total route mileage of existing feederlines would probably more than double. In the case of the nation's first local carrier, Pioneer Air Lines, this degree of expansion has already taken place. Pioneer's AM 64 was increased from an original 683 miles to over 1,400 miles in CAB's Texas-Oklahoma decision last November.

Latest pleas for more mileage came last month from Challenger Airlines, which started service in May, and Empire Air Lines. Challenger (formerly Summit Airways) wants its AM 74 extended southward from Salt Lake City to Phoenix, Ariz., via Provo, Richfield, Cedar City and St. George, Utah, Flagstaff and Prescott, Ariz., and other points. Empire is seeking to push its AM 78 westward from Walla Walla, Wash., to Seattle/Tacoma and Portland, Ore.

► **Other Applications**—Most ambitious new route applications from a feeder is that of Southwest Airways Co., which has asked for extensions to San Diego, Reno, Nev., and Yuma, Ariz., and the addition of around 40 more intermediate points. Florida Airways wants to extend its Orlando-Jacksonville-Tallahassee routes south to Miami and west to Pensacola and St. Petersburg. Monarch Air Lines has applied for a new link from Gallup, N. Mex., to Phoenix, Ariz. Even West Coast Airlines, only active local operator not seeking a route extension, has asked for an additional intermediate point.

SHORTLINES

▶ **Air France**—Has begun service between Saigon, Indo-China, and Hong Kong. . . . A new interline agreement with Eastern Air Lines permits passengers to make reservations at any EAL point for transportation abroad via Air France.

▶ **American**—Set a new record for air cargo volume during the first half of 1947. Carrier's freight (including contract operations) totaled 8,011,028 ton miles against 1,627,714 in same 1946 period; express aggregated 2,356,344 ton miles against 1,967,316; and mail ton miles were 3,547,050, slightly under the 3,571,809 reported in the first half of 1946.

▶ **BOAC**—Reports averaging more passengers per flight from New York to London during the ten weeks ended June 15 than either of its American competitors on the run—Pan American Airways and American Overseas Airlines. BOAC's Constellations averaged 31.6 passengers per eastbound trip during the period. . . . Carrier has reduced airfreight rates up to 33% on its transatlantic run and up to 40% on its Baltimore-Bermuda flights.

▶ **British European Airways**—This month will inaugurate new C-47 cargo service connecting London, Brussels and Prague with five roundtrips weekly.

▶ **Eastern**—Has started installation of new Wilcox VHF radio transmitter and receiver equipment in one of the nine EAL Constellations now flying. The equipment operates on 70 channels and is five times more powerful than existing VHF, Eastern states. . . . Carrier has signed an agreement with Railway Express Agency whereby REA will handle all air express shipments to San Juan, P.R.

▶ **KLM**—Reports signing of a Holland-Union of South Africa air transport agreement which probably will permit the carrier to provide thrice weekly service between Amsterdam and Johannesburg. . . . Company plans to increase its Amsterdam-London flights from seven to 14 daily. . . . Amsterdam-Berlin service, originally scheduled to begin July 15, has been postponed until this month.

▶ **Northwest**—May ask CAB permission to turn over its Milwaukee-Green Bay-Wausau-Eau Claire-Minneapolis link to Wisconsin Central Airlines, feeder operator.

▶ **Pan American**—Has flown its 100,000th passenger between New York and Bermuda. Service was inaugurated in June, 1937. . . . Carrier has announced award of travel fellowships to 10 Latin American students who will study in the U. S. during the 1947-48 academic year. The students will receive roundtrip plane passage between their homes and their chosen schools in this country.

▶ **Sabena**—Set a new commercial speed record between New York and Brussels when its DC-6 (first to cross the Atlantic) made the run in 11 hr. 45 min. flying time last month.

▶ **Scandinavian Airlines System**—Has cleared up its passenger backlog to Europe and is now offering immediate eastbound reservations, with return space guaranteed without waiting.

▶ **Trans-Canada**—Will make a test installation of a radio altimeter and collision warning indicator on one of its aircraft shortly. . . . Negotiations with Eire may permit TCA to make a traffic stop at Shannon on its transatlantic run.

CAB SCHEDULE

Aug. 4. Hearing on Pan American Airways application for service to Melbourne, Australia. (Docket 2881).
Aug. 4. Oral argument in Boston-New York-Atlanta-New Orleans route case. (Docket 730 et al.)
Aug. 11. Hearing on All American Aviation's mail rate case. (Docket 1906.)
Aug. 18. Hearing in Chicago-Helicopter service case. Extended from July 28. (Docket 2384 et al.)
Sept. 2. Hearing in Latin American Certificate Amendment cases of Panagra and Braniff. (Dockets 2527 and 2622.)
Sept. 8. Hearing on Mid-Continent's proposed service between Minot, N. D., and Regina, Saskatchewan. (Docket 628.)
Sept. 8. Hearing in case involving additional service in California-Nevada area. Postponed from Aug. 25. (Docket 2109 et al.)
Sept. 29. Hearing on Mid-Continent's application for alternate Kansas City-New Orleans Route. (Docket 1956.)
Oct. 7. Hearing involving additional Florida Area Service. Postponed from Aug. 12. (Docket 1668 et al.)
Nov. 15. Hearing on Board's Investigation of Consolidated Airfreight Tariff Agreement. (Docket 2719.)

CAB ACTION

The Civil Aeronautics Board:
• Denied National Airlines' application for an exemption authorizing nonstop operations between New York/Newark and Havana, Cuba, over AM 31 and between coterminals Tampa and Miami, Fla., and terminal point Havana (Docket 3012).
• Reissued feeder certificate of Aviation Enterprises, Inc., to reflect the carrier's new name, Trans-Texas Airways (Docket 3015).
• Approved interlocking relationships existing as a result of the holding by Thomas F. Ryan, III, of the following positions: director, Mid-Continent Airlines; controlling stockholder, Quick Dusters, Inc.; managing director, Transport Holdings Pty., Ltd.; and director, Ansett Transport Industries, Ltd. (Docket 2989).

▶ **United**—Flew nearly 34,000,000 revenue passenger miles with its DC-6s during the planes' first two months' service on the system. UAL had received 22 DC-6s by late last month and had 13 still on order. DC-6s were placed on the carrier's Los Angeles-San Francisco-Portland-Seattle route on Aug. 1.

Fleet Expansion Planned

Seaboard & Western Airlines, Inc., New York City, which started contract cargo operations to Europe in May (AVIATION NEWS, May 26), is converting three more C-54Ds for the transatlantic run. The carrier owns two C-54Ds, and the other three have been leased from the government for 18 months, according to Raymond A. Norden, president.

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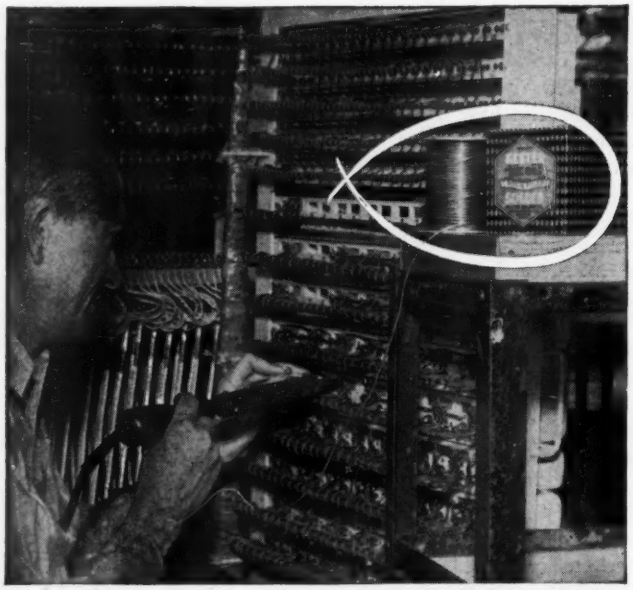

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H. B. Miller, Walsh Resign from TWA

H. B. Miller, TWA's vice president in charge of public relations, and Richard Walsh, his executive assistant, have resigned their positions with the airline.

Formerly director of the Navy's public information with the rank of rear admiral, Miller joined TWA a year ago. He has not announced his future plans. Walsh will become assistant to B. Carroll Reese, chairman of the Republican National Committee.

Announcement of the two resignations closely followed the appointment of Dale Armstrong, former director of Northrop Aircraft's public relations, as publicity director of TWA (AVIATION WEEK, July 14).

Other personnel developments:

● **Air Express International Agency, Inc.**—L. A. Cholot has been appointed vice president. Formerly express traffic manager of Pan American Airways, Cholot will have headquarters in New York.

● **Air Freight Forwarder Association**—Harry A. Bowen has been named general counsel with offices at 412 Metropolitan Bank Building, Washington, D. C. Until six months ago, Bowen was a CAB public counsel.

● **American**—Walter D. Peck, director of route development, has been transferred from New York to the Washington office.

● **CAB**—David E. Postle, chief of the General Rules section of the Board's Safety Bureau, has resigned effective Aug. 29 and will take a position in the aircraft industry.

● **Colonial**—John P. Jones has become superintendent of Bermuda operations.

● **National**—Robert E. Wieland, NAL's special representative in Cuba, has been elected treasurer of the Air Transport Association of Cuba, a new organization patterned after the Air Transport Association of America.

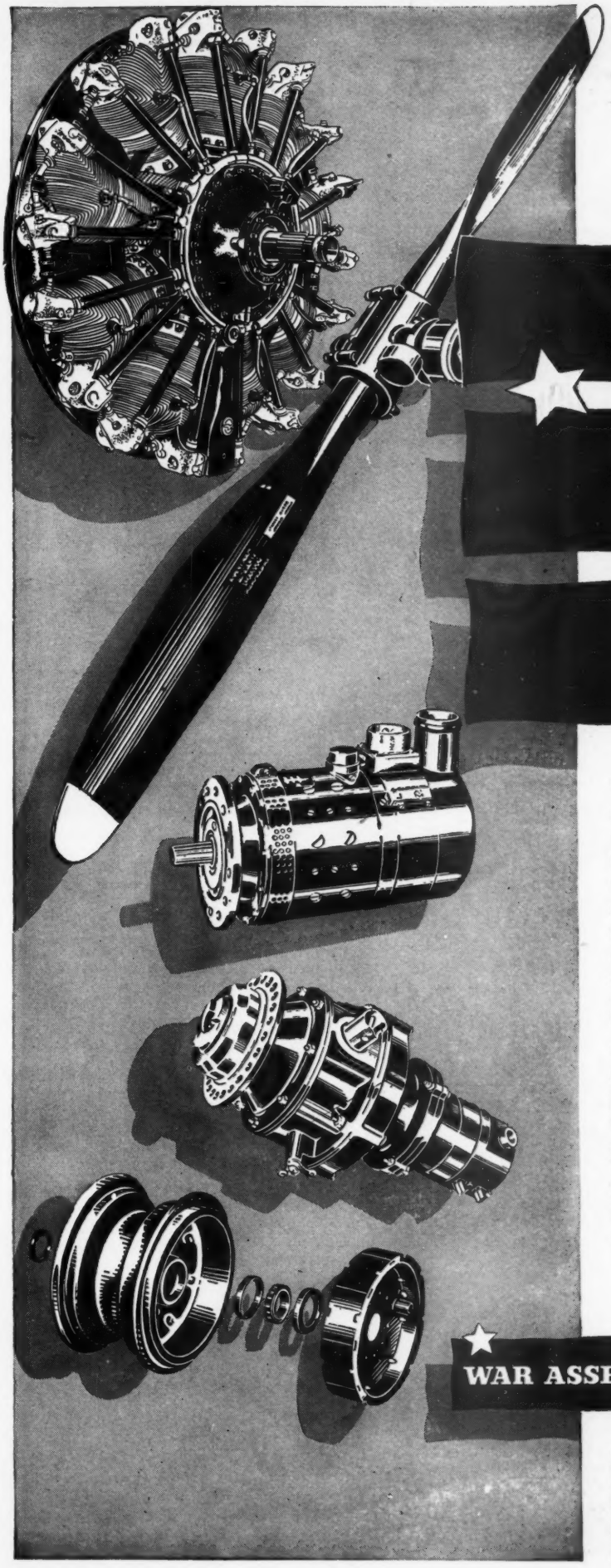
● **Northeast**—George F. Scott has been named general traffic and sales manager following the resignation of Warren H. Smith, general sales manager. Scott had been general traffic manager since March, 1946.

● **Slick**—W. F. Rogers, former UNRRA director of transportation for the Balkans, has been appointed assistant to Earl F. Slick, president of the airfreight line.

● **United**—T. Lee, Jr., has become director of education and training. He will also serve as personnel manager for the carrier's Cheyenne maintenance base.

Frye in New Post

Jack Frye, former president of TWA, has been named president of General Aniline & Film Corp., replacing George W. Burpee, who resigned recently. Frye became chairman of General Aniline's board of directors last April, shortly after leaving TWA following disagreement with the policies of the airline's majority stockholder, Howard Hughes.



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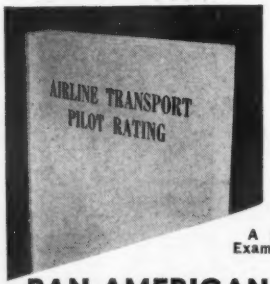

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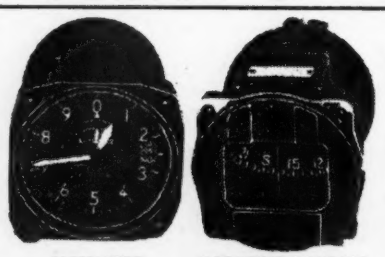

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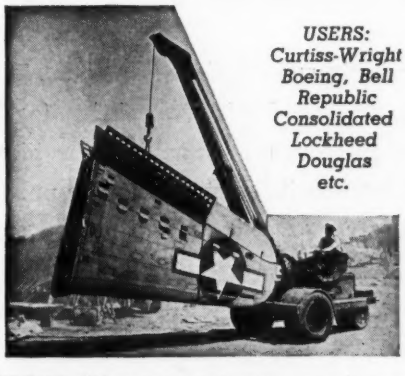

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EDITORIAL

Progress in the Battle for Safety

Cheering progress reports come from the airlines on new collision warning devices. But it will still be another tough winter.

Civil Aeronautics Board is circulating a suggested regulation which would require installation of electronic terrain indicators by January 1. The devices must show absolute clearance of the aircraft above terrain and set off a visual or audible signal in the cockpit when the aircraft dips below the minimum.

This proposal was recommended by President Truman's Air Safety Commission and we believe it should be required by the proposed date. It is the one positive step which airlines can take now to insure safer flying.

There are gratifying indications that several airlines will not wait for the CAB requirement. They are pushing ahead on their own, after too long a period of inactivity by the industry generally.

TWA, which already has electronic altimeters, continues installation of Hughes-adapted equipment bought from war surplus.

Continental has ordered the Hughes equipment. Several others are considering it.

American and Pan American are at work.

United has announced purchase of 200 RCA electronic altimeters to equip its fleet before winter. As reported elsewhere in this issue of AVIATION WEEK, the RCA unit weighs only 30 pounds. An alarm may be set at any range up to 8,000-ft. below and ahead of the plane. Lights and an indicator needle report to the pilot.

Although it was no surprise to observers of the keenly competitive air transport industry, the unexpected announcement of the TWA collision warning indicator set off a series of petty outbursts. Instead of giving credit to the first airline to make such an earnest effort to do something about collisions, some competitors sniped and struggled against any move to prevent accidents like American Overseas Airlines' mountain crash in Newfoundland, analyzed by CAB the other day.

Neither TWA nor United represent their equipment as perfect. But it certainly is far better than nothing at all. The President's Safety Commission has agreed, by approving both, along with one or two others.

It is true that terrain clearance indicators are only a partial answer to air safety. But the type of accidents they will minimize is among the worst and most frequent. Speedy action to equip our airliners will do much to restore public confidence in air transport that has been shaken by slow-moving CAA, sensational Congressional investigations and a tendency on the part of the airlines themselves to wait for something better instead of making use of what is available now.

Current Army, Navy and Congressional thinking is turning to the use of radar as the basic tool of a modern airways system capable of handling all-weather operations and heavy traffic density. Sooner or later CAA and its anti-radar group will simply have to cry uncle to the inevitable. In typical CAA fashion, it will probably be later—years later.

Nevertheless, terrain clearance indicators are here. We accept the word of the President's Commission for it that any of several are adequate. The industry gives every indication of meeting its obligation to the public to install them as soon as money can buy them and mechanics can install them.

Even so, we cannot expect miracles. It will be another expensive winter. There will be far more canceled schedules than the public now expects. Many hopes for improved service next winter, roused by Congressional investigations last spring, have vanished in legislative bombast and government red tape.

When the chips were down Congress slashed air safety funds to ribbons, leaving the airlines with about the same outmoded airways they flew last winter, while piling up huge deficits from bad crash publicity and shattered schedules.

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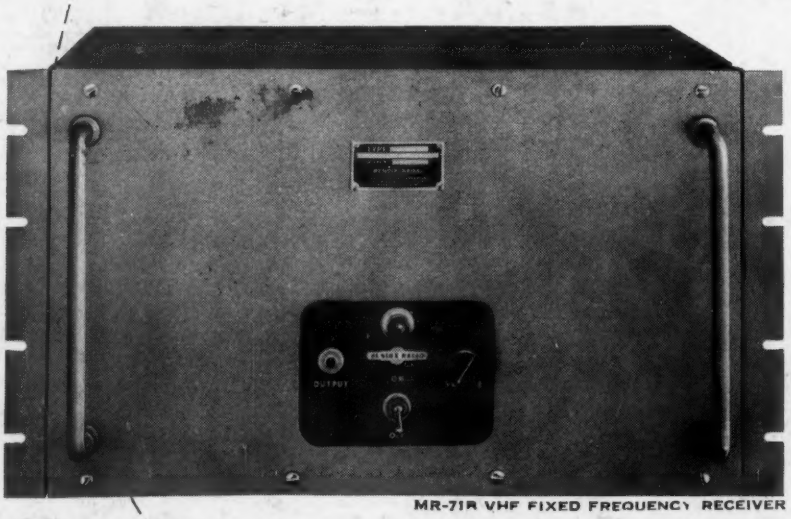

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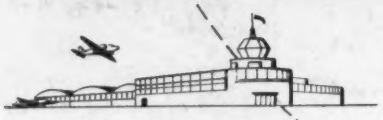

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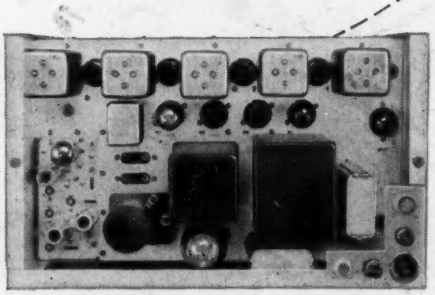

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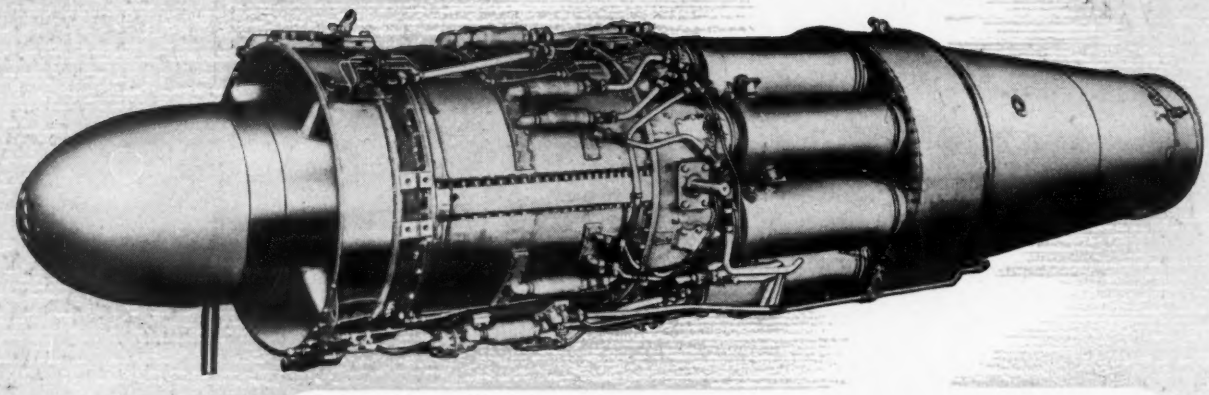
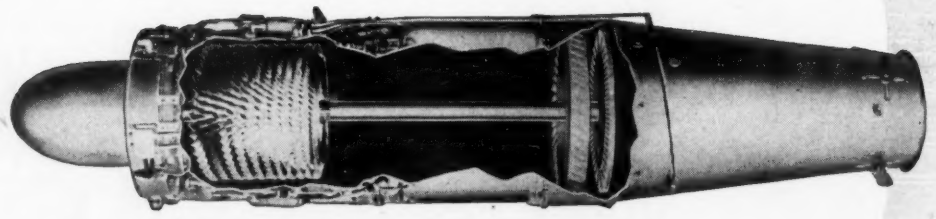
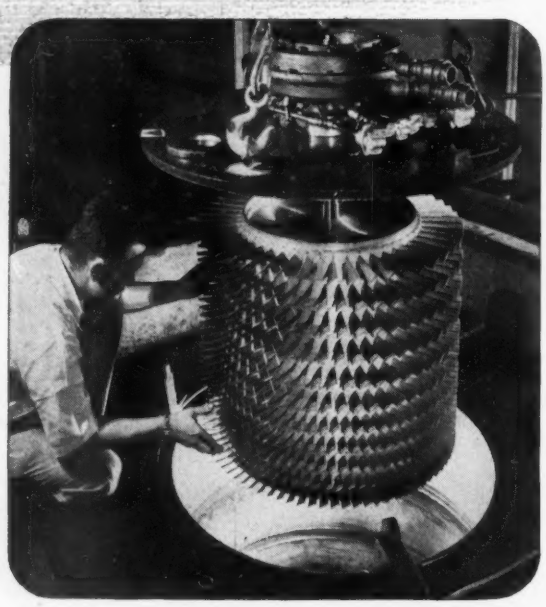


The General Electric TG-180 jet engine shown above develops the equivalent of 5000 h.p.—air speeds well over 500 m.p.h. Right, an artist's conception of a jet engine interior shows, left to right, many-bladed compression assembly, shaft, nozzle diaphragm and turbine wheel—precision components built by Thompson Products.



The jet engine was a toy 2000 years ago!



Nearly 2000 vanes, blades and buckets go into the various jet engine components built by Thompson Products for the TG-180. The rotor compressor assembly pictured here is being lowered into a testing pit where it is whirled at high speeds during final inspection.

THE BASIC PRINCIPLES OF JET PROPULSION have been known since Hero of Alexandria, 130 years B.C., designed a primitive engine to operate a toy.

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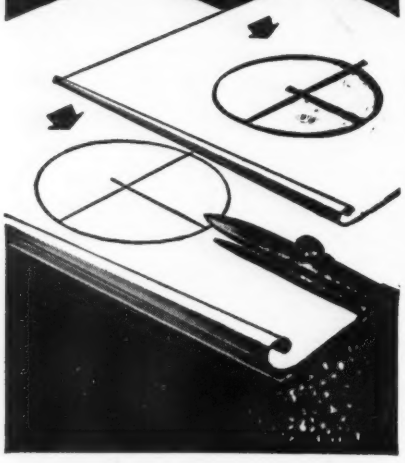

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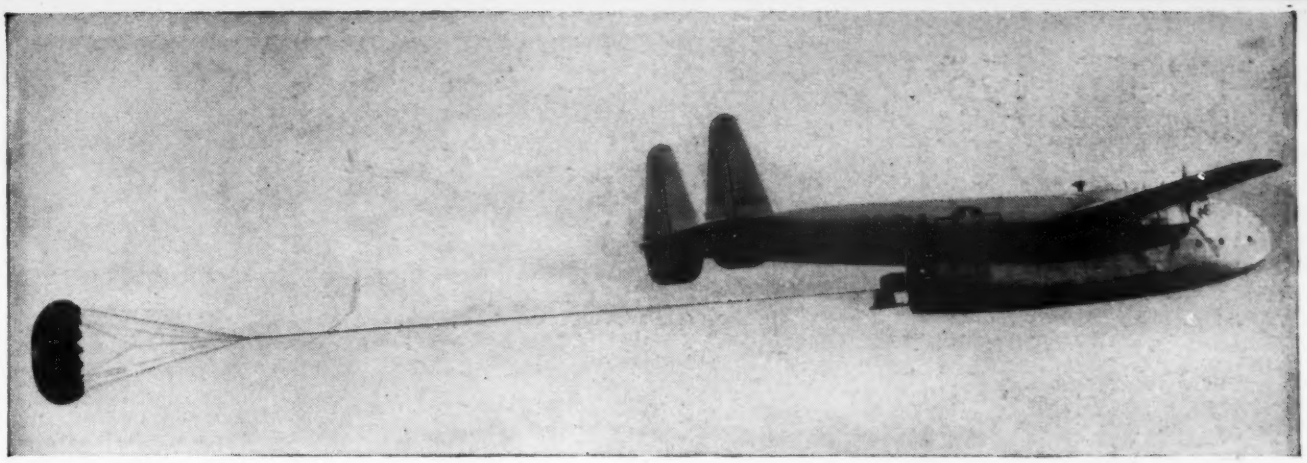

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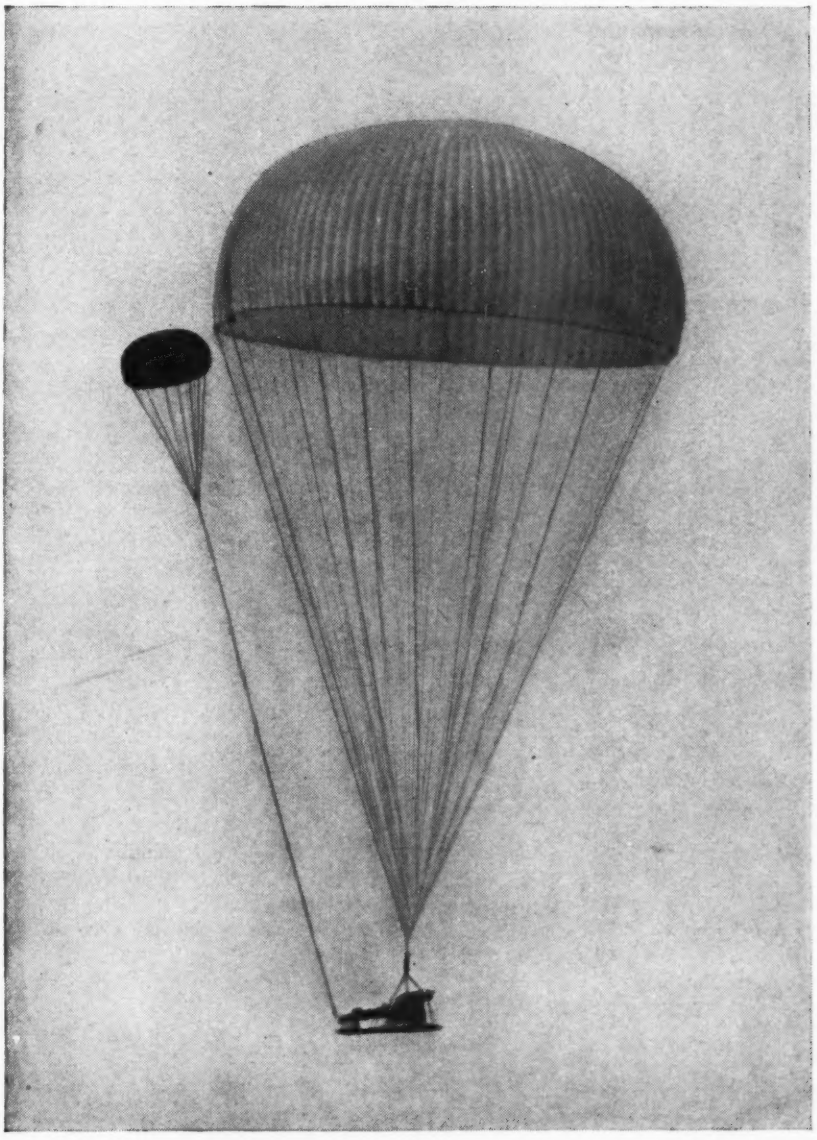

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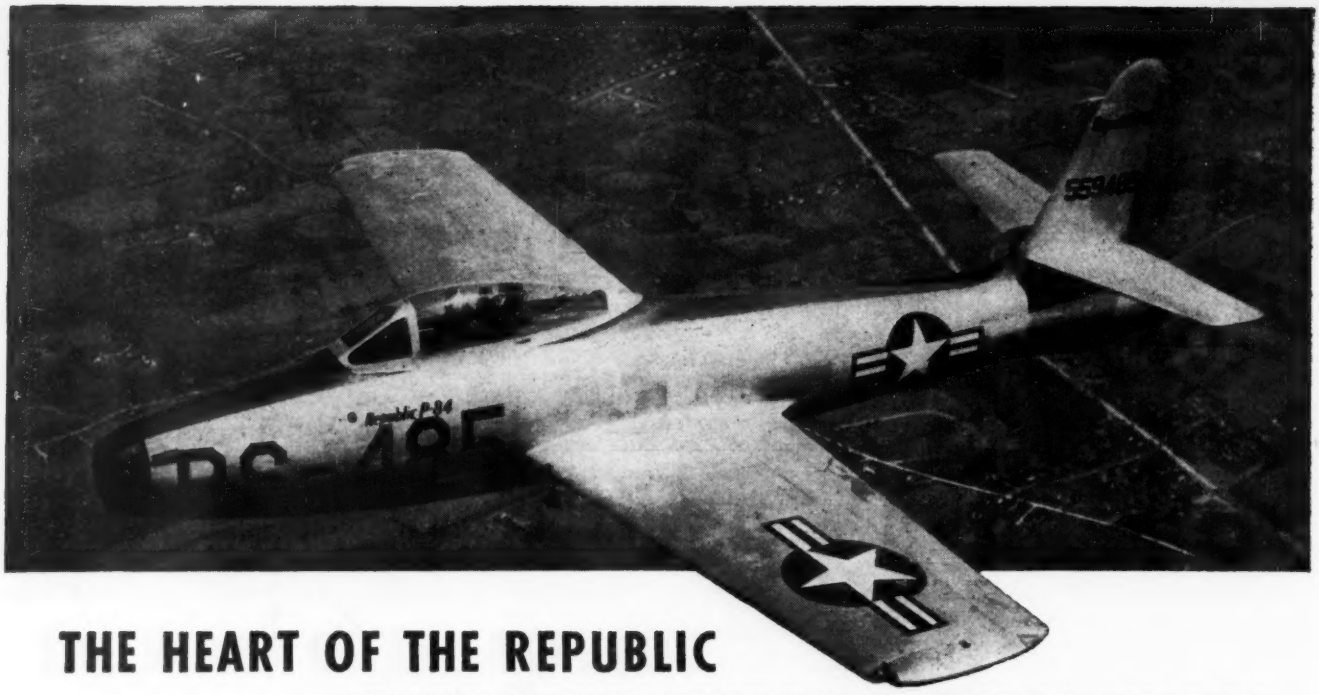

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THE AVIATION WEEK

CHARGE TO CHANGE—Aviation attention focused on Capitol Hill and the charges of Howard Hughes against Sen. Owen Brewster has been partially diverted to a change in the Government's aviation administration—John R. Alison for William A. M. Burden as Assistant Secretary of Commerce for Air. Somewhere along the line in the closing days of Congress, the selection of George A. Stone, of Columbus, Ohio, picked some months ago to succeed Burden, ran into opposition. His name never went to Congress.

Appointment of Alison was a complete surprise. Industry scrutiny of his background relieved some of the puzzlement. In addition to an excellent war record as an airman, Alison worked with Commerce Secretary Harriman when the latter was Ambassador to Moscow. Although Alison has never held a civilian aviation post that could be considered a training ground for his new job, there is some opinion this might be an asset. He could bring a fresh approach and no prejudices to a badly muddled situation.

NO COMFORT FOR CAA—One thing seems apparent. His appointment should bring no end to the pressure on CAA. Administrator T. P. Wright reportedly desires to deal only with Secretary Harriman on aviation matters. At a recent joint CAA-Army-industry conference, Wright asked an industry member to work with the Army representatives as "I don't get along with them very well." Alison, in the regular Army before the war, served as a colonel in the AAF.

BREWSTER'S BOOMERANG—As the Hughes investigation bumbles along like a man finding something he never knew he lost, Washington observers more and more are coming to the belief that if Maine's Owen Brewster, in stirring up the inquiry, thought he was throwing his hat in the ring for the Republican vice-presidential nomination, he actually was throwing a boomerang.

Although Brewster is not a member of the investigating subcommittee, he has turned up as one of the main figures by virtue of Hughes' charges that the Maine Senator used the threat of an investigation to try to force a TWA-Pan American Airways merger. The fact that merger discussions took place at the time Hughes said they did, and that Brewster has been a long-time friend of Pan American, and that Brewster did try to persuade Hughes to embrace the chosen instrument proposal, all add up to a possible uncomfortable future for Brewster's political ambitions.

With the investigation rambling all over the air map, Hughes' troubles with TWA, and vice-versa, are part of the picture. TWA never has received the second $5,000,000 Hughes loan, nor the RFC loan which Hughes said he would attempt to negotiate when he reorganized the company last spring. On top of reports that the Hughes ready cash is running low, comes strong indications of a growing interest in TWA by the duPont family. This interest lends further significance to the moving of TWA New York and Washington offices to Wilmington scheduled for early fall.

SECRET AS A PARTY LINE—Further light has been shed on the manner in which the investigation is being conducted, leaving little doubt as to the motives which prompted it. Elliott Roosevelt, star of the show before Hughes appeared on the scene, asked who had released to the newspapers the itemized account of entertainment expenses of Hughes press agent John W. Meyer, which were given to the subcommittee in "secret" session. Chairman Homer Ferguson said "I haven't any idea." Actually, the list of expenses was mimeographed and handed to press representatives by committee clerks.

CHANGE IN SAFETY—While the Alison appointment and the Hughes investigation vied for attention, the Presidential Air Safety Board was slipping out of the limelight. The change that characterized other aviation developments has been manifest here, too. After a hot start, the Board has cooled off. Some close to the scene say it has bogged down. CAB Chairman James M. Landis insisted the board remain at work all summer, but slow recent progress may be due to his preocupation with other duties.

AMPHIBIOUS OPERATION—The state of change in the armed services following the merger was to be expected, but not the extent to which it has gone. The Navy is not voluble, and a trifle chagrined about it, but carrier pilots have resigned their Navy commissions to accept commissions in the new, autonomous U. S. Air Force. One was an Annapolis graduate and a lieutenant commander. He is now a lieutenant colonel in USAF. Air Forces reports it has processed several pilots who resigned Navy commissions and accepted commissions in the Air Force Reserve. A further indignity to the Navy point of view is that Joe Foss, Congressional Medal of Honor winner and former Marine pilot, is now Commander of the South Dakota Air National Guard, part of the USAF.

The transfer from the sea-borne to the air-borne air force is just a trickle, but it may grow.

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NEWS DIGEST

DOMESTIC

Boeing B-29 "Pacusan Dreamboat" broke two closed-course distance records: 6,213 miles over a Patterson Field-Benson, Ariz. course averaging 277 mph. and 8,855 miles over a Patterson Field-Andrews Field, Md.-Tucson, Ariz. Triangular course averaging 227 mph. Lt. Col. Olbert F. Lassiter, AAF Strategic Air Command, flew both missions.

Frank H. Russell, organizer of the Manufacturers Aircraft Association in 1917, died at Newtown, Pa. He organized the original Wright Company in 1909, served as president of Burgess Aeroplane Co. In 1911, vice president and director of Curtiss Aeroplane and Motor Co. and in the same capacity at the Edward G. Budd Mfg. Co.

CAA Administrator T. P. Wright signed the revised Federal-aid airport program for the construction or improvement of 908 airports at a cost to the government of $66,569,590 with local or state sponsors providing an additional $70,235,095.

Air Force Association will publish Air Force Magazine, produced during the past year by Phillip Andrews Publishing Co.

Dr. A. C. Krueger has joined the staff of Airborne Instruments Laboratory, Mineola, New York as supervising engineer, antenna design section. He was formerly with the Manhattan Project and Republic Aviation Corp.

FINANCIAL

Mid-Continent Airlines reports net profit of $6,914 during June against $34,853 profit the same month a year ago.

Minneapolis-Honeywell Regulator Co. had a net income, after provision for taxes, of $3,302,343 for the first six months of 1947. This is equivalent, after preferred dividends, to $2.51 per share on 1,243,800 shares of common stock outstanding. It compares with net income for the corresponding 1946 period of $1,630,666 or $1.18 per share.

AVCO Manufacturing Corp. reports net income for the six months ended May 31, 1947, after taxes, totaled $3,175,339 equal after preferred dividends to 44 cents per share on 6,613,424 common shares outstanding. Net sales for the period were $50,747,235.

FOREIGN

Bilateral Air transport agreement between India and France has been signed at New Delhi.

Air France plans to reduce its trans-Atlantic air cargo rates 34 percent on shipments over 100 lb. effective Aug. 24.

Ministry of Civil Aviation announces that BOAC has acquired a second hand Lockheed Constellation for reconditioning for use on trans-Atlantic routes.

1500 POUNDS SAVED

BY BUILDING THIS BODY OF REVERE MAGNESIUM

Photo courtesy Sprecksell Body, Inc., Detroit

Sprecksell Assembly Methods Permit High Production at Moderate Cost

The first magnesium alloy truck panel body built by R. K. Sprecksell of Detroit was for use in his own general delivery and cartage business. The results impressed him so favorably that he established Sprecksell Body, Inc. to manufacture and sell magnesium alloy bodies.

After thorough investigation of available body materials, Sprecksell standardized on Revere magnesium alloy extruded shapes and sheets. Their use, he says, makes it possible "not only to save the maximum amount of weight, but to design for maximum strength and maximum output." The bodies are built in sub-assemblies, which are then assembled into solid structural units, permanently fastened by Huck Lockbolts of the hole-filling type. After sheeting, the husky, replaceable rub rail is riveted into place and the doors hung. Interior finishing and painting follow, according to individual job specifications.

"All this adds up," according to Mr. Sprecksell, "to durable truck bodies that will weigh 1500 pounds less and pay for their added cost in a very short time." In addition, drivers report that trucks equipped with these magnesium bodies handle as easily as a passenger car, thus reducing driver fatigue.

If you operate vehicles for highway or air transportation, Revere magnesium alloys can help you save gas, oil, tires and other operating expenses or enable you to carry additional payload. With Revere sheets and standard shapes, you or your body builder can produce truck panel bodies of magnesium alloys easily and quickly. Readily available for prompt shipment, these Revere materials can be assembled into bodies by means of the simplest fabricating methods.

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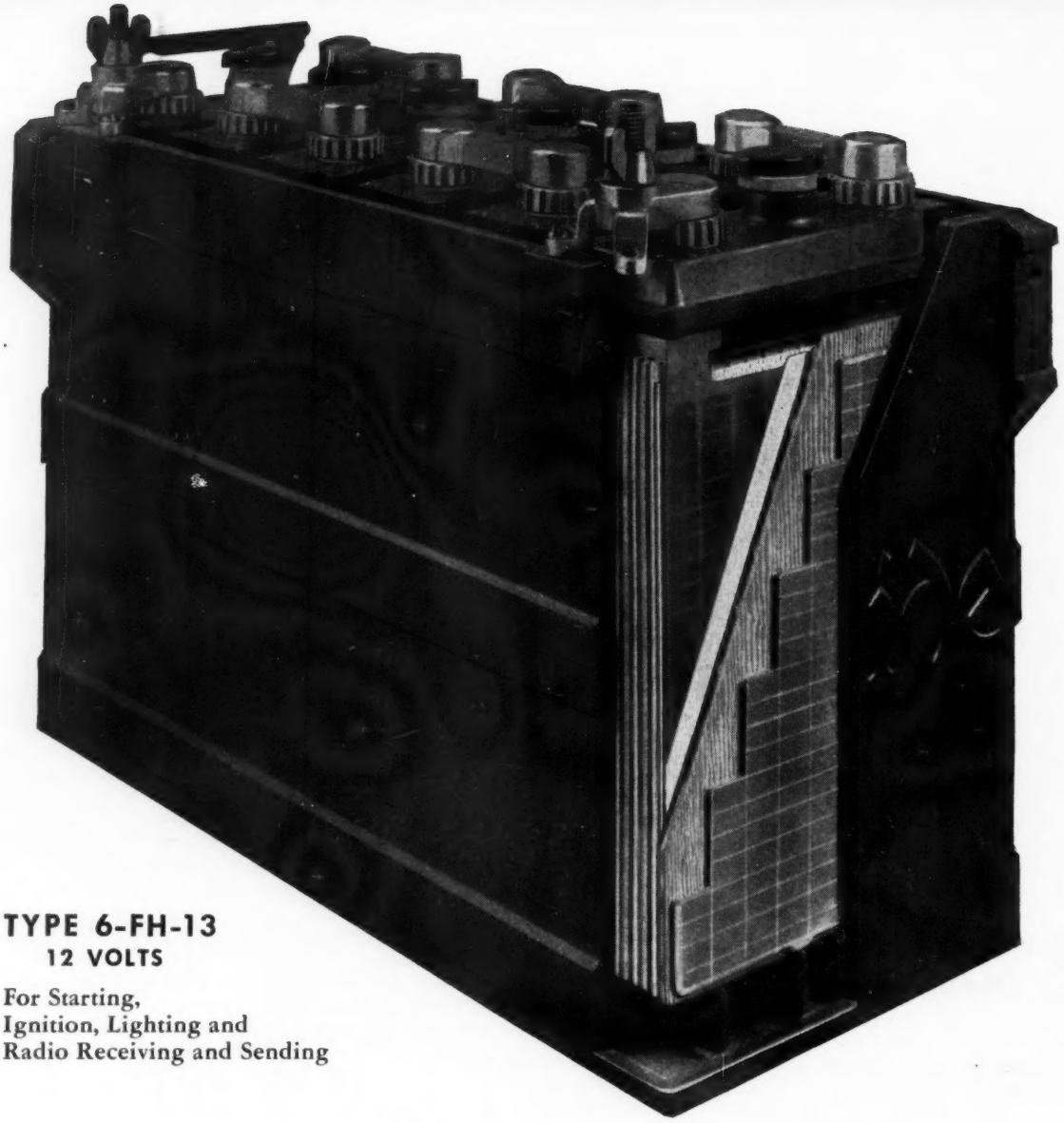

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VOL. 47 • NO. 6

AVIATION WEEK

AUGUST 11, 1947

INCORPORATING AVIATION AND AVIATION NEWS

Hughes Levels New Charges In Pan American-TWA Feud

Claims Brewster used Senate probe threat to force airline merger; reveals War Department threat to turn TWA Stratoliners over to PAA.

The long standing TWA-Pan American Airways feud over international air routes was aired again last week as Howard Hughes, TWA majority stockholder, blasted Senator Owen Brewster (R., Maine) with new charges linking the chairman of the Senate War Investigating Committee with Pan American pressure to keep TWA out of international operations. The Senate committee is currently probing Hughes wartime contracts for the XF-11 photo plane and the HK-1 200 ton flying boat.

Hughes charges were made in a series of Los Angeles press conferences and open letters to Brewster published in the Los Angeles Examiner after that paper offered Hughes its front page for six days to air his grievances.

▶ **Conferences Revealed**—Hughes revealed that he had conferred with Juan Trippe, Pan American president, last winter regarding merger of TWA and PAA and that he had finally rejected the merger proposal after considering it for 30 days, because "the deal would have not been equitable for other TWA stockholders."

AVIATION NEWS reported on March 3 that discussions were under way between Howard Hughes and Pan American officials on possibilities of merging the two airlines to give Pan American its long sought domestic routes and solve TWA's financial problems.

▶ **Collings Denial**—Hughes would neither confirm nor deny the story but Sam Pryor, Pan American vice president and former Republican national committeeman from Connecticut, denied the conferences. John Collings, acting executive vice president of TWA, issued a statement to TWA employes that "any reports of a merger of TWA and Pan American Airways are erroneous and irresponsible and without authentic foundation."

Hughes also claimed that Brewster made an "abortive attempt" to "intimidate and coerce me" (Hughes) into merging TWA with Pan American Airways by offering to call off his investigation of the Hughes Aircraft Co.'s wartime contracts if the merger were accomplished. This attempt, Hughes charged, was made at luncheon in Brewster's Mayflower Hotel suite during the week of Feb. 10.

▶ **Aviation News Report**—AVIATION NEWS reported in its Feb. 24 issue that:

"The leading proponent of the community airline on Capitol Hill is conducting a one-man missionary campaign on Howard Hughes. Senator Brewster and the West Coast aviation executive have spent many hours together recently, many of them traveling. Hughes is said to be "leaning" toward the community company idea. And other TWA executives wonder whether it is because of the threat of a full fledged quiz into the Hughes-Kaiser cargo plane deal by Brewster's War Investigating Committee."

"Brewster was perfectly frank," Hughes declared. "He laid his cards on the table.

"Under the circumstances and since the threat of investigation was obviously created in the first place as a blackmail weapon to maneuver me into the merger with Pan American airways I did not consider that giving in to their demands would necessarily be dishonest on my part . . .

"Since I felt the birth of the investigation was illegitimate, I did not consider that its elimination would be a crime . . . I never did reach a decision on the morals, because, at the end of our negotiations the merger deal Juan Trippe offered was not one I considered equitable from the standpoint of other stockholders in my company, TWA."

▶ **Many Pleasant Hours**—Hughes also charged that Brewster accepted free transportation and extensive entertainment from Pan American. He alleged that Brewster spent "pleasant weekends" at the home of Sam Pryor at Hope Sound, Fla. and "many, many pleasant hours" being entertained in Washington by Pryor, Juan Trippe and Bill McEvoy, PAA public relations executive. Brewster denied any connection with Pan American.

The Brewster investigation really began, Hughes charged, when TWA challenged Pan American on the North Atlantic. When it happened, Jack Frye, then TWA president, who later resigned over policy differences with Hughes, told him:

"Howard, you are going to learn that Pan American Airways has the biggest, most complex and strongest political machine that has ever hit Washington. Juan Trippe feels you have moved in on his territory, which he considers to the entire world outside the U. S., and he is going to make your life miserable. You have no idea the lengths to which these people will go."

"Juan Trippe and Brewster made it very clear to me that they only needed TWA in order to put their community company airline bill through Congress and make it a law," Hughes continued. "They could shove it down the throats of the other overseas airlines if they could just get TWA on their team. Then Juan Trippe, who already has the biggest airline in the world, would wind up with a complete monopoly, automatically and quite legally, putting all the smaller airlines out of business and taking over their routes and airplanes."

▶ **Stratoliner Deal**—Hughes also charged that during the war the War Department attempted to take TWA's five Boeing Stratoliners away from the company and turn them over to Pan American to fly the Atlantic.

Brewster's presence on the Senate Interstate and Foreign Commerce Committee, which passes on aviation matters, is considered unusual because of the custom of not having two senators from the same state on the same committee. Senator Wallace White, also of Maine, is committee chairman. Brewster has been concerned with TWA's financial affairs since last January. As head of the aviation subcommittee he began an investigation into airline finances at which he took testimony from CAB Chairman Landis in executive session on TWA's financial condition. This investigation was shelved in favor of a probe of airline safety after a series of fatal airline accidents last winter.

Both Brewster and Hughes have asked the Justice Department to investigate the Hughes charges. Brewster has offered to take the stand as a private citizen before the Senate War Investigating Committee to answer questions on Hughes' allegations. Brewster introduced legislation calling for the community airline in the last session of Congress but it never was reported out of the Senate Interstate and Foreign Commerce Committee. Similar bills failed of passage three times previously in Congress.

Elliott Roosevelt Assails Materiel Command for "Failures"

Wartime photo-reconnaissance planes were easy prey for German fighters, says President's son; Arnold defends XF-11 deal.

The Senate's War Investigating Committee abruptly dropped consideration of the $18,000,000 Kaiser-Hughes 200-ton flying boat project last week to probe the XF-11 reconnaissance plane project of Howard Hughes.

Circumstantial evidence stacked up by the Senate group, aimed at indicating that the political influence of Elliott Roosevelt, inspired by lavish entertaining by John Meyer, Hughes public relations man, resulted in an expensive misadventure into wooden reconnaissance plane production, was countered with blunt charges by Roosevelt of collusion between the Air Materiel Command and its wartime chief, Maj. Gen. Oliver Echols, and the established aircraft industry to freeze out independent aircraft manufacturers.

▶ **Scores P-38**—At the request of AAF's commanding general, Gen. H. H. Arnold, Roosevelt returned from the European Theater in August, 1943, to tour the U. S. aircraft plants and ascertain the type of reconnaissance plane which should be put into production. The Lockheed P-38 planes being used by U. S. Forces were being "shot down like ducks by the Germans and even had trouble evading Italians," Roosevelt reported. He cited one two-and-a-half-month period in which his squadron of 92 planes was reduced to one plane. Plywood Mosquitos being used by the British "were doing a wonderful job," he said, "in spite of the fact the Materiel Command said wooden planes were no good."

Roosevelt's report of September, 1943, overriding the objections of the Air Materiel Command and AAF's flat ban on wooden planes, resulted in the awarding of a $50 million contract to Hughes for 101 of the Duramold F-11 reconnaissance craft.

▶ **AAF Feared Politics**—Chief of Air Staff, Lt. Gen. Barney Giles, and Echols, then assistant chief of air staff, had turned down the Hughes plane with an emphatic and final "no" only one week previously and protested the letting of the contract—ordered by Arnold. A month after the contract was let, Echols' assistant, Maj. Gen. Charles E. Branshaw, warned that "It is concluded that in view of the amount of money involved and many uncertainties connected with it that this project will probably at a later date draw Congressional attention and possibly public criticism upon the AAF."

Insinuating collusion with established aircraft manufacturers, Roosevelt pinned blame for failure of the Hughes project on the Air Materiel Command. AMC refused to permit Hughes to go ahead with production of his original prototype with the modifications proposed by him, Roosevelt said, and forced major design changes causing, at one time, eleven months delay in negotiations. AMC, he insinuatingly observed, "was extremely interested in having war contracts performed by those already in the field." Turning to Echols, its former chief, he added: "Who does he work for now? The Association of American Aircraft Manufacturers." (Echols is AIA president).

▶ **Flags Materiel Command**—Roosevelt testified that the Materiel Command had a personal objection to Hughes because he was using manpower in his plant that they thought should go to other companies. When asked if he knew that officers down the line refused to approve the XF-11 without direction of the Secretary of War, Roosevelt replied:

"This is indicative of the spirit in which the Materiel Command approached the entire problem of procurement in all theaters. I criticize General Echols' position in the first place that he should try to protect himself so much on the delay in the photo plane."

▶ **"Miserable Failure"**—Roosevelt suggested that the Committee question Echols "as to whether his judgment might not have been swayed by the fact that he is now working for these war contractors who did not want to see criticism of them spread on the record after the war." He charged that the Materiel Command "failed miserably" as far as the European and North African Theaters were concerned in "getting us the equipment and supplies we needed." He said that in many instances it was necessary to set up conversion depots overseas to make equipment usable after it had been received from the Materiel Command.

Roosevelt said he was requested by Robert Lovett, then Assistant Secretary of War for Air and General Arnold to "see if I couldn't find a new aircraft manufacturer because the old ones were already overburdened."

In a press conference preceding his testimony, Roosevelt charged that the true story of U. S. air reconnaissance in the war would never be told the public because "too many big shots are trying to cover up their record." He said there were "too many favored manufacturers whose production breakdowns have to be covered up."

▶ **Arnold Defends XF-11**—Arnold joined in the defense of the Hughes project, stating it "was the best we could get at the time. . . . Hughes' was the only plane that had prospects of equalling the Mosquito."

The Hughes contract was scaled down to three planes—one for static testing and two flyable models. The Government has accepted the static model, and in January of this year "accepted" the flyable model in which Hughes crashed last summer. Government payments to Hughes, which will ultimately total $13 million, plus $8 million for termination settlement, amount to $8,557,568 to date. Since AAF insured its own planes during the war, it was obliged to "accept" and pay for the crashed model.

▶ **Methods Ineffective**—The Committee's attempts to develop circumstantial evidence that the late President Roosevelt had a hand in the Hughes project were ineffective. Elliott Roosevelt denied having taken the matter up with his father. The spotlight was turned on a memo written by former

AAF Blames Hughes

An Army Air Force accident investigation board ruled that the crash of the Hughes XF-11 at Los Angeles July 7, 1946 "was avoidable after propeller trouble was experienced," and charged "poor coordination by the principals—Hughes Aircraft Company employees, Air Materiel Command and Howard R. Hughes."

Referring to the test flight of the XF-11 when Hughes as pilot almost lost his life in a forced landing that completely wrecked the experimental photo reconnaissance plane, the board pointed out that pilot error constituted the main cause of the crash. Five main charges were leveled at Hughes:

- **He did not use** the specially provided radio frequencies and facilities.
- **He was not** sufficiently acquainted with emergency procedure for the propeller.
- **He immediately retracted** the landing gear after take-off in direct violation with the flight program which specified that the maneuvers were to be conducted with gear down.
- **He did not** give proper attention to the possibilities of an emergency landing when sufficient altitude and direction control were available.
- **He failed** to analyze or evaluate the possibility of failure in the right hand power sector.

Summing up, the board stated that "several indirect causes contributing to the accident were a result of technique employed by the pilot in operating the aircraft and in following the procedure as outlined in the flight test program."

Failure of a rear propeller, the board claimed, was apparently a secondary factor.

RFC Chairman Jesse Jones, a close friend of Hughes, to the late President in June, 1942 highly praising the Hughes plane, but there was no evidence that the President did any more than refer the memo to Arnold with a note, reading: "What is there in this?"

The Senate group, headed by Sen. Homer Ferguson (R., Mich.), concentrated on gleaning details and sidelights from the expense accounts of publicity man Meyer, showing expenditures totaling $5,083 on Elliott Roosevelt between September, 1943, and November, 1945—or only a small portion of Meyer's total expenditures of $169,661 for the period. It was developed that many expenditures listed for Roosevelt were for parties at which he was only one of ten or twenty guests.

▶ **Lists Companies**—Roosevelt pointed out that he had also been entertained in fine style during the war by "Douglas, Lockheed, Fairchild, Curtiss Wright, Girdler, General Electric, Ford, Chrysler, Pan American" and a long list of other firms.

The switch in hearing subject matter occurred last week after a series of witnesses testified on the $18 million contract awarded for the flying boat, but minus testimony by the two key defense witnesses for the project: Donald Nelson, former WPB chairman and Admiral William Leahy, chief of staff to the President.

In September, 1942, one week after the Joint Chiefs of Staff had officially rejected the flying boat project, Leahy and Nelson, following a White House conference with Henry J. Kaiser and his assistant, Chad Calhoun, gave it the green light. At the behest of Jones, the contract for three planes let the following month delegated engineering development to Hughes.

▶ **Flying Boat Facts**—Other facts developed on the flying boat project:

• **In February, 1944,** Nelson cancelled the project on which $13 million had then been expended. It was estimated it would take from $5 to $6 million additional to complete one plane. Jones interceded with the late President Roosevelt. A Jones memo to Nelson informing that the President believed that the aeronautical data to be obtained from the giant ship warranted its completion resulted in the letting of a new contract in March, 1944.

• **Under The Terms** of the contract, negotiated by Jones, the Government would not be able to take over the plane—now awaiting to make its first test flight in Long Beach, Cal.—for approximately four years. Hughes is authorized to keep the plane for a rental—amounting to approximately $500,000 annually—to be charged against his investment in the project, up to $2,000,000. Hughes reports a private investment of $7,000,000 in the project.

• **Total Government Outlay** for the plane will amount to $21,115,970. In addition to the $18 million for the ship, the Government is committed to furnish $1 million for testing, $500,000 for moving the plane from the Culver City plant to Long Beach, and $1,615,000 for engines and propellers.

MORE JET POWER

Lockheed P-80Bs lined up prior to delivery to U. S. Air Force. Under new contract, company will furnish 32 additional P-80Bs to Air National Guard, which already has 54 on order.

The parade of witnesses on the Kaiser-Hughes undertaking included:

• **Three CAA Officials**—Deputy Administrator Charles Stanton, A. A. Vollmecke, and W. A. Klickoff—pointed to CAA progress reports at the Hughes plant picturing wastage of materials, improper tooling and lax conditions.

• **H. Robert Edwards,** Regional DPC supervising engineer, portrayed the plant as "sort of a country club" where employes "quarreled constantly, costs spiraled unheeded, and nobody was boss."

• **Edward Bern,** former general manager of Hughes Aircraft, reported that inter-company politics, hamstringing work, caused him to resign.

Personnel Studies Aim At New Warfare

Studies of psychology and psychophysiology of problems involved in civilian defense and resistance against immediate attack from enemy aircraft or long-range guided missiles will be made by a newly-formed Committee on Human Resources formed by the Joint Research and Development Board. Headed by Dr. Donald G. Marquis, chairman of the department of psychology, University of Michigan, the new group includes Maj. Gen. Fred L. Anderson of the Army Air Forces and Rear Admiral J. W. Roper of the Navy Dept.

A major phase of the studies will be methods establishing the qualifications and selection, allocation and utilization of personnel for special military purposes including duty in remote air bases subject to extremes of heat and cold and high altitude bomber and fighter crews. The studies will be under the general supervision of Dr. L. R. Hafsted, newly named JRDB executive secretary.

Air Policy Group Gets Working Orders

Homeless commission receives new ACC statement.

The Presidential Air Policy Commission last week had one of its basic working tools—the revised statement of air policy of the Air Coordinating Committee—but no home. Appointment of John R. Alison as Assistant Secretary of Commerce for Air means the commission will have to give up the office it has occupied while the air post was vacant.

With such basic organizational details as office space, clerical help and appointment of an executive director still to be resolved, the commission has held no formal meeting for about ten days, but is expected to form again next week.

▶ **Policy Approved**—The new statement of air policy of ACC was expected to be made public late last week or sometime this week after receiving formal approval of the President. It is a declaration of principles, sketching merely broad outlines of things that should be done, rather than a detailed list of recommendations. Such a detailed list will be prepared by Stanford University in the form of a revision of the 1945 ACC report.

As far as procurement is concerned, it is expected that ACC's new policy statement will call for minimum annual procurement of 5,000 military planes.

▶ **Solon Board Busy**—The Congressional Air Policy Board likewise is too concerned with initial organizational problems to have taken a bite into its new job. Following the President's signature on House Resolution 3587 establishing the ten-man group, the following were appointed: Sens. Owen Brewster (R., Maine); Albert Hawkes (R., N. J.); Homer Capehart (R., Ind.); Ed Johnson (D., Colo.); Ernest McFarland (D., Ariz.); Reps. Charles Wolverton (R., N. J.); Carl Hinshaw (R., Cal.); Karl Stefan (R., Neb.); Alfred Bullwinkle (D., N. C.); and Paul Kilday (D., Texas). The senators are all members of the aviation subcommittee of the Interstate and Foreign Commerce Committee, while all House members except Stefan were on the subcommittee which investigated air safety.

Some of the members are out of town; others, Brewster for one, are engaged in other Congressional business and there is no indication when the board may settle down to work.

Earling Leaves C&S

Albert J. Earling, vice president and director of Chicago and Southern Air Lines, has resigned. In charge of C&S traffic and sales during the past two years, Earling left to become president of Southwestern Supply Co., distributor of pre-fabricated homes. T. M. Miller, C&S general traffic manager, will take over Earling's airline duties.

John Alison Named To Commerce Post

President Truman has appointed John R. Alison, former AAF colonel and Gainesville, Fla., aviation consultant, to the post of Assistant Secretary of Commerce for Aeronautics, recently vacated by William A. M. Burden.

The appointment is subject to Senate confirmation next January and carries with it direction of the Civil Aeronautics Administration, U. S. Coast and Geodetic Survey and the U. S. Weather Bureau, as well as membership on the Air Coordinating Committee and the National Advisory Committee for Aeronautics.

Alison's wartime record includes command of the 23rd Fighter Group, successors to the original "Flying Tigers", in Maj. Gen. Claire L. Chennault's 14th Air Force in China. Alison joined the AAF in 1936 and went to England in 1941 as RAF advisor on the operation and maintenance of American airplanes. He accompanied Harry Hopkins and Gen. Joseph T. McNarney to Moscow that same year as adviser on American lend-lease aircraft. He remained as air attache to Russia in 1941-42 and later coordinated lend-lease in the Persian Gulf area after U. S. entry into the war.

Alison's wartime decorations include: Distinguished Service Cross, Distinguished Flying Cross, Silver Star, Purple Heart, Legion of Merit, Air Medal and the British Distinguished Service Order. He resigned from the AAF last year to organize an executive air transport service in Florida to provide transportation for industrial companies on a fee basis. He takes office immediately in Washington.

Certification Near For Martin 2-0-2

Glenn L. Martin Co.'s Model 2-0-2 last week was near certification, several months shy of two years from the time construction began on number one airplane.

With the accelerated service test completed, the CAA certification board at midweek was meeting in the Martin plant to iron out the final details of licensing the twin-engine, 40-passenger transport.

In nine days, the 2-0-2 visited 38 cities and covered 16,700 miles in 69 hr., clipping minutes and in some cases hours from the scheduled airline time between points along the route. The 2-0-2 flew from Memphis to El Paso, for example, in 4 hr., 26 min. less than DC-3 time.

The CAA accelerated service test calls for 150 hr. of flying, but credit may be given for other service flights.

Northwest Airlines has been flying a 2-0-2, and Martin has put more than 500 hr. on the two airplanes the company is retaining for its own use.

Martin expects to deliver two certificated 2-0-2s to Northwest this month.

Industry Observer

► **Navy has completed tests of two Grumman F6F Hellcat fighters equipped with .60 cal. machine guns and reports are being studied. Tests proved satisfactory and a quantity of the guns is being procured for further service tests. Decision on replacement of .50's throughout fleet units has not yet been made.**

► Navy has supplied AAF and McDonnell with technical data and operational experience on dirigible-type aircraft mooring hooks, with which the tiny XP-85 is equipped. Wide disparity between XP-85 minimum flying speed and B-36A cruising speed presents a problem to which only piloting technique offers a solution at present. Various combinations of flaps, slots and spoilers are being studied for XP-85 to slow its minimum speed to at least 150 mph. for "coming aboard" the B-36A.

► **Second Martin XP4M-1 is now undergoing flight and ground tests at the Baltimore plant. Total P4M-1 order now stands at 24.**

► Douglas expects to taper off its 10 a month DC-6 production rate this fall as major commitments to domestic carriers are met. Douglas has now built 60 of the big transports or 45 percent of 141 orders now on hand.

► **AAF personnel are still manning three airfields on the wartime top secret Crimson Ferry route through Northern Canada to Greenland. These fields at Chimo in Northern Quebec, Frobisher along the fringe of Baffin Island and Mingan on the Quebec coast have been purchased by the Canadian Government for $30,000,000 and will be manned by RCAF personnel this fall.**

► Glenn L. Martin told the Senate war investigating committee that his company has modified 30 B-29s to carry atomic bombs and that no more had been modified since the end of the war because it was impossible to keep pace with changes in the bomb. He indicated that the B-29 cannot be re-designed or converted to carry newer type atomic bombs, indicating that the B-50 and B-36 will be the atomic bomb carriers of the immediate future.

► **Potentials of the new types of strategic transports are being explored by the Air Transport Command. In recent tests a complete materiel depot was moved from Florida to the Canal Zone by Douglas C-74 and C-54. The C-74 carried 951,405 lb. in 41 trips while it took a C-54 16 trips to carry 104,405 lb. C-74 averaged 29,603 lb. pay load against 6,525 lb. for the C-54.**

► A double-ended aircraft JATO unit, with a center valve which directs the combustion products out of either end, has been patented by Constantin P. Lent, N. Y. engineer. The unit could be used for rapid deceleration of supersonic aircraft for landing and acceleration for takeoff.

► **Navy has developed a Zyglo process, which utilizes ultra-violet "black light" for the inspection of special turbojet alloys, which defy ordinary magnaflux inspection.**

► AAF studies indicate that air transport services now being operated by military agencies in Europe could be handled more economically by commercial contract operations but Air Transport Command is bucking a policy shift on the grounds that higher costs are justified by training military crews for troop carrier operations.

► **Boeing is scheduled to get an AAF contract for 27 more C-97 Stratofreighters making a total of 37 to be manufactured for the AAF. Last model of the initial order of 10 is equipped to handle 134 fully equipped troops.**

► Norwegians are operating an airline service along their northern coast with British Sandringham flying boats equipped with airborne radar.

► **AAF is sponsoring research on high speed bomber armament systems utilizing conventional machine guns and cannon in the belief that these weapons will remain standard even though bomber speeds enter the transonic range.**

► Indication that unusual soundproofing techniques will have to be developed for the after cabins of military or commercial wing-jet aircraft was given recently when the pilot of North American Aviation's B-45 jet bomber entered the tail compartment in flight to adjust flight recording instruments. He reported excessive noise from shock waves of the plane's jet exhaust. In this particular plane it is expected that sealing and pressurization of the tail gunner's compartment, in production units, will provide ample soundproofing. Sound experts generally agree that special soundproofing will be required for any inhabited portion of an airplane structure entering a 90 deg. cone extending behind a jet engine tail pipe.

► **On a showing that runways should not be considered taxable as "industrial" property, Lockheed Air Terminal at Burbank, Cal., won a $218,400 reduction of assessed valuation originally fixed at $882,700. Robert E. Gross, President of Lockheed Aircraft Corp., in seeking the assessment cut, told the county board of supervisors that the reduction was vital to his company to permit the air terminal's continued competition with "tax free" Los Angeles Municipal Airport.**

Convair Price Rise

Consolidated Vultee Aircraft Corp. has increased the price of its Convair Liner (formerly Model 240) effective Sept. 1, from $315,000 to $360,000 due to increased labor and material charges and a shrinking foreign market caused by the dollar shortage.

The new price applies only to domestic orders. The foreign price of about $325,000 probably will go up proportionately. The increase was announced in advance, Sales Vice-president W. A. Blees stated, to give prospective purchasers an opportunity to place their orders at the old price.

First FIDO Planned For Los Angeles Field

Construction of the first U. S. commercial FIDO installation may begin in September at Los Angeles airport. Five major airlines using the terminal tentatively have agreed to amortize over a five year period about 50 percent of installation costs, and to assume operation and maintenance costs during that time.

Engineering plans for the installation, now 80 percent completed, will be ready within 30 days for presentation to Air Transport Association and airline engineers for approval. It is expected that construction bids then will be called for without delay.

▶ **Cost Rising**—Woodruff De Silva, Los Angeles Airport manager, told AVIATION WEEK that while the FIDO project in original proposal contemplated an installation cost not to exceed $450,000, the final plan may raise the cost to nearly $650,000.

The program now under consideration calls for the city's application to the Federal Government for federal aid funds amounting to approximately 50 percent of total installation cost.

Although this would leave a maximum of more than $300,000 of installation charges to be paid off by airlines during five years, plus operating and maintenance charges, airline spokesmen indicate that it will prove a sound investment.

▶ **Seek Economy**—Lew Goss, of TWA's staff at Los Angeles, who has been named airline coordinator for the FIDO project, says that economies effected by reducing alternate airport arrivals and departures will more than meet the amortization charges.

One indication of the penalty of alternate airport operations is an airline report that a single bad-weather schedule diversion from Los Angeles Airport to Palm Springs, involving one four-engine airplane, costs $400. Intangible costs include the loss of potential airline business as a result of passenger ill-will generated by broken schedules and the confusion of bus transportation from the alternate airport to the terminal area.

Airlines participating in the Los Angeles FIDO test will be United, American, TWA, Western and Pan American.

New Training Types For Service Schools

The Army and Navy have substantially eliminated the biplane primary trainer from the military pilot training program and will start future students on 600 hp., 6,000 lb. advanced training types in the future. Navy's transition from the N3N and N2S "Yellow Perils" to North American SNJ series has been completed and the Army Air Forces has completed one class and is processing a second making substantial use of North American AT-6 types throughout the course.

Elimination of the light, primary-type trainer and the preliminary dual and solo of the type from the flight syllabus follows lengthy examination of extensive evidence that such flight time not only contributes little to the learning rate but actually creates habits which may later prove dangerous when the neophyte pilot is graduated to heavier, faster combat types.

AAF's March, 1947 primary class used AT-6s extensively, although not completely, in the course and 14 out of 20 students passed, an attrition rate slightly lower than average. Subsequent classes are utilizing the AT-6 an increasing percentage of the total hours with eventual complete conversion planned.

Navy's decision was made on the basis of its March, 1947 class of 100 at Naval Air Training Base, Corpus Christi, Texas. This class was given primary instruction in SNJ types in accordance with a program worked out by Capt. James Thatch and Rear Admiral Clifton A. F. Sprague, Navy Basic Air Training Command. Aircraft procurement problems also were elements in the decision, the Navy having originally planned future pilot training in Fairchild NQ primary and North American SN2J types, both of which have completed flight tests in prototype form and declared approved for procurement. Budget slashes will prevent the production of either of these types and the large quantity of SNJ's now on hand accelerated the decision.

Following graduation from the SNJ-AT-6 primary training stage, students will move directly into obsolescent combat types for advanced training. Navy will use Grumman F6F, Vought F4Z, Grumman TBF (Eastern TBM) and Convair PBY's for advanced and operational training. AAF will move students into North American P-51, Republic P-47, North American B-25, Convair B-24 and Boeing B-17 types for advanced and operational training.

BOEING XL-15's FIRST FLIGHT

With Elton H. Rowley, flight test chief at Boeing's Wichita Div. at controls, radical new liaison craft makes steep climb on initial test flight. Powered by 125-hp. Lycoming, XL-15 is designed to clear 50-ft. obstacle in 600 ft., cruise at 101 mph., and land at 35 mph. First and second X-jobs are due for delivery this month, followed by ten YL-15s on order.

LETTERS

Air France and Sabena Protest

U. S. directors of both lines write that AVIATION WEEK comment libeled them.

To the Editor:

In your issue of July 28, in the section "The Aviation Week," Sabena is the subject of some rather ill-considered and inaccurate remarks. Since these misstatements of fact are detrimental to international aviation as a whole, and not only to Sabena, we feel that this letter should be accorded the courtesy of publication.

Starting with a service between Brussels and Paris, in 1923, Sabena's unduplicated route mileage today totals more than 15,000 miles, and we have flown almost 200,000,000 passenger miles to date. In 1946, alone, we flew 4,574,865 miles and carried 121,178 passengers. If one includes our immedia e predecessor in the Congo (the King Albert Line, organized in 1920) we are among the first three or four airlines in point of operations.

The criticism expressed by "U. S. Airmen" is additionally misleading, in view of the fact that Pan American World Airways is in charge of maintenance and operation of our aircraft in the U. S., while Sabena reciprocates in Belgium.

All of Sabena's equipment on the North Atlantic route is new. Our DC-4s are not converted C-54s, but new Douglas four-engined planes.

All of our flight personnel are internationally trained and have received special training at the Douglas plant at Santa Monica, Cal., the Eastern Air Navigation School, New York, N. Y., and at Pratt & Whitney. This includes six months of study on the Douglas DC-6. Sabena is the first foreign carrier to receive delivery of this new American post-war luxury liner, and is at present demonstrating its first of three ships to all the principal cities on its routes. On board are representatives of two leading press services and one of this country's leading weekly news magazines, as well as Douglas officials.

Douglas Larsen of NEA, one of those aboard, just returned from part of the flight, and a newspaperman who has flown some 200,000 miles reports that, based on his observations, Sabena is operating close to the top of any airline he has ever flown with.

Our operational experience includes flights over every type of terrain and water conditions. Our routes include flights to almost all capitals in Europe, the Belgian Congo, to Egypt and South Africa.

Our advertising in the United States, handled through an American local agency, stresses the points brought up in this letter and "sells" Sabena on the basis of its experience, reputation and equipment. "Old World courtesy" is an added service to passengers, but not the theme or sum total of Sabena's consideration for its passengers.

We regret the need for bringing these facts to your attention, but we are certain that you will want your readers to be properly informed on this matter. We feel also that Sabena is entitled to a proper expression of facts in your news columns, and we will appreciate publication of an early correction of your statements.

FERNAND J. MARTENS
U. S. Manager, Sabena

To the Editor:

I am writing to you to ask for a retraction of your editorial reference to Air France in the July 28 issue of AVIATION WEEK, which is most unfair and certainly not founded on fact.

You report "U. S. airline men say the Scandinavians, Dutch and British, in that order, are doing the best operation and maintenance. The Belgians (Sabena) and French (Air France) are probably the worst." Our Atlantic record certainly does not call for such an appraisal.

Using American aircraft, maintained by Americans, Air France is proud of its trans-Atlantic performance. Our maintenance has been done by TWA and American Airlines, both American companies, and now by Lockheed, manufacturers of the aircraft we are flying in our Atlantic service. I must insist that this fact be published in the same columns in which you published the reference to Air France and Sabena as "probably the worst."

As far as our operations are concerned, may we point out that Air France's record of arrivals and departures is excellent and airport authorities will testify as to the splendid schedule we have maintained. Furthermore, may we point out that Air France's safety record is unmarred by casualties.

We believe that, if you will investigate the facts, you will find that Air France has one of the best, if not the best, operations across the Atlantic. Confidence of the traveling public in Air France's operations, based upon 28 years of over-water flying experience, is reflected in the volume of traffic we have been carrying across the Atlantic. Frederick Graham of the New York Times recently reported in an article on trans-Atlantic traffic that Air France was leading the field in payload. Such leadership must be deserved.

The statement published in AVIATION WEEK is a libel on Air France, the French National Airline, now serving 54 countries on five continents.

HENRI J. LESIEUR
General Manager
North American Region

(*Editor's Note*—AVIATION WEEK hopes to make its own future study of the relative standards of U. S. and foreign owned international airlines.)

AVIATION CALENDAR

Aug. 11—International Air Transport Association, tariffs and schedules subcommittee, Paris.
Aug. 13—CAA-sponsored State Aviation Forum, Nashville, Tenn.
Aug. 16—ISAO communications working committee, Mexico.
Aug. 16-17—Oakland Air Show, 20th anniversary of the Dole flight, sponsored by Junior Chamber of Commerce, Oakland, Cal.
Aug. 18-22—Airport Managers school, Hancock College of Aeronautics, Santa Maria, Calif.
Aug. 19—International Air-Transport Association, financial committees, Paris.
Aug. 21-22—West Coast transportation and maintenance meeting, Society of Automotive Engineers, Biltmore Hotel, Los Angeles.
Aug. 25—International Air Transport Association, financial-accounting and statistical subcommittee, Paris.
Aug. 28—International Air Transport Association, financial-clearing house subcommittee, Paris.
Aug. 30-Sept. 1—National Air Races, Cleveland, Ohio.
Sept. 1-4—Fall meeting American Society of Mechanical Engineers, Salt Lake City.
Sept. 1-10 — International Air Transport Association technical conference, Nice.
Sept. 3—International Air Transport Association, financial committee, Brussels.
Sept. 6—Anglo-American conference, Institute of the Aeronautical Sciences and Royal Aeronautical Society, London.
Sept. 8-12—Second annual conference and exhibit, Instrument Society of America, Hotel Stevens, Chicago.
Sept. 15-17—Air Force Association, first annual convention, Columbus, Ohio.
Sept. 16—ICAO rules of the air and air traffic control meeting, Montreal.
Sept. 16—International Air Transport Association, technical committee, Nice.
Sept. 16-18—Second Regional CAA conference, Atlanta.
Sept. 17 — ICAO meteorological division, Montreal.
Sept. 23—ICAO aerodromes, air routes and ground aids division, Montreal.
Oct. 2-4—Autumn aeronautics meeting, Society of Automotive Engineers, Biltmore Hotel, Los Angeles.
Oct. 3-4—Arizona State Aviation Conference, Douglas, Ariz.
Oct. 6—International Air Transport Association, executive committee, Rio De Janeiro.
Oct. 7—International Air Transport Association, traffic committee, Rio De Janeiro.
Oct. 14—International Air Transport Association, third annual general meeting, Petropolis.
Oct. 15-18—Montreal Board of Trade, second annual air conference, Montreal.
Oct. 20—International Air Transport Association, executive committee, Petropolis.
Oct. 20—Air Industries and Transport Association of Canada, annual meeting, Gray Rocks Inn, St. Jovite, Quebec.
Oct. 20—ICAO meeting on commercial rights. Petropolis.

Narrowing Profit Margins Intensify Mail Pay Drive

Airline applicants for increased compensation include companies in sound financial condition.

The drive for higher mail pay is on in no uncertain manner. Increased mail compensation now is being sought by a different type of applicant—the financially sound and more profitable carriers. Late last year the parade for relief started with the ailing airlines seeking to bolster their diminishing resources with higher mail pay. For the most part, this group consisted of companies in the subsidized category or recently removed from that class. In recent weeks, however, National, United and Eastern have petitioned the Civil Aeronautics Board for higher mail pay. Yet, none of these companies is in any immediate danger of financial difficulties despite current adverse operating results. Moreover, they are on a "compensatory service" rate basis and are among the least dependent upon mail revenue support.

About a year ago, in an article appearing in the Analysts Journal published by the New York Society of Security Analysts, this writer concluded: "...within 12 to 18 months, many, if not all, of the domestic airlines may petition the CAB for relief and seek higher mail compensation."

► **Squeeze Discernible**—This belief was predicated on the impending squeeze on profit margins of the various carriers then becoming discernible but not yet recognized by the industry and investment fraternity. It was pointed out that operating expenses have been steadily mounting while the revenue rate structure had been declining. This trend of narrowing profit margins continued with increasing intensity throughout the second half of 1946 and the early part of this year. The result was near-disastrous for many of the weaker situated carriers and a severe jolt to the well-entrenched lines. A series of unfortunate accidents and bad flying weather compounded the difficulties and accelerated the trend.

When it was seen that earnings were turning into heavy deficits, weakened carriers petitioned the CAB for emergency relief, asking higher mail pay. All such pleas were presented on a "need" basis and sought refuge in the protection believed present in the Civil Aeronautics Act. The Board came to the rescue with increased mail compensation based on a new wrinkle in computing mail pay. Outwardly the basis for determining mail pay has not been changed. Yet a number of airlines are finding their mail pay increased as much as ten-fold by getting paid for mail they don't carry. This is done by payment on the basis of "minimum capacity factor." This "factor" becomes a guarantee of weight and is used in figuring the carrier's mail pay regardless of the actual mail carried. This is illustrated by the PCA decision applying this new formula. For the period Jan. 14, 1947 to March 31, 1947, PCA will receive payment for 700 pounds of mail per mile at the rate of 60 cents a ton mile. Actually, its 1946 mail loads averaged 74 lb. per plane mile. Accordingly, solely on a tonnage basis, with a 700-lb. minimum capacity factor, PCA will receive a return of about $5.75 per ton mile for the mail actually carried compared to the 60 cents per ton mile previously received. A sliding scale has been developed so that the amount will taper off over the next two years. For example, PCA's minimum capacity factor is reduced to 600 lb. for the three months ended June 30, 1947, to 550 lb. for the subsequent nine months ended March 31, 1948, declining gradually to only 250 lb. beginning Oct. 1, 1948.

► **New Element**—This rate method was introduced for PCA, Chicago & Southern and Western. Colonial and Northeast never left the subsidy category and were recently given increased mail pay on the old plane mile basis. The table shows the recent mail rate increases granted and those pending and their relative significance.

The character of Eastern's mail pay increase request, along with that of United and National, differs materially from the emergency applications filed by the other lines. Eastern, for example, has no intention of seeking a return to the "need" category. It merely seeks to bring mail pay into better balance with present costs and traffic levels while remaining on a compensatory service but nonsubsidy rate. Both Eastern and United are receiving currently a rate of 45 cents a ton mile and conceivably would be satisfied at present with a 60 cents per ton mile rate. National is seeking a departure from this pattern by requesting compensation with a minimum capacity factor.

► **Eastern Profit**—It is interesting to note that Eastern would have been capable of operating at a profit during 1946 without any mail revenues whatsoever. Its total mail compensation amounted to $1,409,231 out of net income of $4,505,000. However, the 45 cents a ton mile rate is clearly out of line with passenger fares of about 5 cents a mile which would bring the comparable mail rate to around 50 cents a ton mile.

It is also probable that Eastern along with United and National recognize the importance of filing as soon as possible for higher mail pay, as in the past CAB awards have been declared retroactive from the date of filing. Thus far American, Delta and Northwest are the only carriers who have refrained from filing for higher mail compensation.

In any event, the current mail pay structure has developed wide disparities between various airlines. For example, American competes with Colonial for non-mail revenue between a number of points, yet the rate of mail payments for Colonial is about 16 times that of American. Similar disparities exist elsewhere and point to the constant "flexibility" in Board policy in establishing rates for the separate airlines as circumstances may have dictated.—**Selig Altschul**

Recent Mail Rate Increases Granted and Pending

		§Current Return per Ton Mile	Previous Return per Ton Mile
Temporary Rates Granted			
Chicago & Southern (Domestic Only)	$0.60 per ton mile with payment for 700 pounds minimum capacity factor	$4.90	$0.60
Colonial	$0.20 per plane mile	7.23	1.50
Northeast	$0.25 per plane mile	15.50	6.85
PCA	$0.60 per ton mile with payment for 700 pounds minimum capacity factor	5.75	0.60
Western	$0.60 per ton mile with payment for 700 pounds minimum capacity factor	2.74	0.60
Pending Rate Applications			
Braniff	$0.30 per plane mile	3.31	0.60
TWA	$0.30 per plane mile	1.88	0.45
Continental	$0.30 per plane mile	9.97	3.73
National	Minimum capacity factor	§§	0.60
United	Exact amount not defined	§§	0.45
Eastern	Minimum rate requested	0.60	0.45

§ All projections based on 1946 results
§§ Amount not specified

Douglas DC-9 Proposed As Replacement for DC-3

Specifications of new transport circulated to airlines for comment; will carry 28 passengers, cruise at 242 mph.

Douglas Aircraft Co. has finally disclosed its own plans for a proposed replacement of its famous DC-3—a market that until now has been the battleground of Consolidated Vultee and Glenn L. Martin.

As yet the Douglas DC-9 is only a proposal. Drawings and specifications are being circulated to airlines to test the market. The company has no mock-up or prototype. It will not concede it will build the DC-9. But observers familiar with the company that for years was the greatest supplier of transport planes note that the new design bears a DC designation—generally the tip-off that the design is more than a study.

► **10,000 lb. Load**—With its 10,000 lb. plus useful load, accomodations for 28 passengers, and cruise speed of about 242 mph., the DC-9 seems more nearly competitive with the forthcoming 20-passenger Beech Model 34 Feederliner than it does with the 40-passenger, faster Convair Liner, Martin 2-0-2 or 3-0-3. In effect, the DC-9 is competitive with the Convair and Martin planes not on a performance, but on what might be termed a philosophical basis.

Douglas apparently believes that the airlines need, as a DC-3 replacement, not a 40-passenger, 280-300 mph. transport, but a smaller, slower plane with lower stalling speed (75 mph. for the DC-9) and shorter take off and landing runs. It is on that concept, plus the not small value of the Douglas name, that the company seems to be pinning its hopes.

Main factor being considered by both airline and manufacturing representatives is the time element. If the DC-9 is built, production probably is at least two years away. The Martin and Convair airplanes should be in airline use by the first of the year. The question seems to be how long can an airline wait to replace DC-3s on which it may be losing money. It is too early yet to gauge airline reaction to the DC-9 proposal, although United, for one, has indicated more than passing interest.

► **Delay Puzzling**—The long delay in the company's announcement of its project plane is the more puzzling as the plans actually date from about the same time as the DC-8, the pusher Mixmaster which was built only in a bomber version for AAF. Anticipating possible adverse reaction to the unorthodox features of the DC-8, Douglas began studying a more conventional design as an alternative. When the airline reception to the Mixmaster design proved to be cool, the DC-9 began shaping up.

The new plane in appearance is as conventional as the DC-8 was unconventional (see sketch) except for the high aspect ratio wing.

It has tricycle landing gear with single nose wheel and dual main wheels. Passenger door is on the left side at the rear, although an alternative arrangement would give a door opening under the tail. Cabin can be pressurized or not. Pressurization would add about $15,000 or $20,000 to the estimated fixed $280,000 price.

Comparison of the proposed DC-9 and the DC-3 follows:

	DC-9	DC-3
Span	101 ft.	95 ft.
Length	75 ft	64 ft.
Gross Weight	30,000 lb.	25,200 lb.
Useful Load	10,406 lb.	8,600 lb.
Wing Area	850 sq.ft.	987 sq.ft.
Wing Loading	35 lb./sq.ft.	25 lb./sq.ft.
Range	2,125 mi.	2,400 mi.
Economical Cruise	242 mph	180 mph.
Top Speed	257 mph	210 mph.

The DC-9 would be powered by Wright Cyclone 1820 engines rated at 1,475 hp. dry for take off, and 1,525 hp. with water. The cruise speed of 242 mph. could be achieved on 765 hp. per engine. The airplane could also use the new Pratt & Whitney 2180 engine rated at 1,650 hp. for take off. Estimated take off distance at gross weight is 3,640 ft., and landing distance, 3,800 ft.

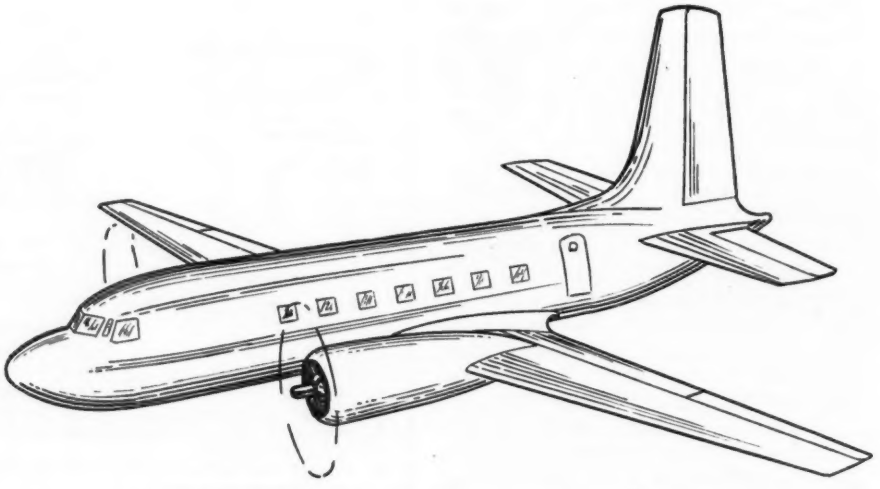
While the proposal for the DC-9 represents Douglas thinking on a DC-3 replacement, some indication of the company's thoughts on what will follow its DC-6 are seen in a paper prepared for delivery at last week's Los Angeles meeting of the Institute of the Aeronautical Sciences by R. S. Shevell, Douglas aerodynamicist. In this Shevell outlines a 40-passenger, 12,000 lb. payload transport powered by four turbo jet engines each of 4,960 lb. static thrust.

► **Proposed Jet**—Just as in the case of the DC-9, there is no evidence that the company at this time contemplates manufacture of the jet transport. If the transport industry could provide a market sufficient to pay engineering and tooling costs, and if no better design were developed subsequently, the Douglas jet transport probably would embrace the following:

- Highly streamlined fuselage and sharp sweep-back of wing and tail, the wing sweep reaching a maximum of 37½ degrees.
- Cruising speed of 490 mph. at 35,000-40,000 ft. with top speed above 500 mph.
- Economical range of 750 mi.

Shevell told AVIATION WEEK that "the design studies were prepared for analysis of the characteristics of a jet transport that could be built with engineering knowledge available at the time."

Shevell emphasized that the jet transport does not represent any Douglas proposal for a new transport now contemplated for production. The status of the DC-9 is only slightly firmer. However, with the Air Forces apparently back in the market transports, it could be that Douglas—as do other manufacturers—hopes that government money will be forthcoming to meet development costs of airplanes that may later be adaptable for the commercial market.



ARTIST'S SKETCH, based on company drawings, of Douglas DC-9.

THE Swift IS HERE TO STAY!

A Statement by Texas Engineering & Manufacturing Co. .... New Manufacturers of the Famous All-Metal Swift

THE GLOBE SWIFT has been acclaimed one of the nation's few truly "post-war" personal aircraft. It combines advanced performance with exceptional utility and flying ease. Many pilots call the Swift the finest airplane in the two-place field. More than 1,200 Swifts now flying in North and South America, Africa, and Europe have won international recognition for splendid cross-country performance. Texas Engineering & Manufacturing Co., Inc., is proud to announce the purchase of patent and manufacturing rights on the Swift from the Bankrupt Globe Aircraft Corporation along with tools, raw materials, supplies and sub-assemblies. Temco's full resources are now behind continued Swift production and servicing. We assure all Swift owners, dealers, and prospective customers that the Swift is in the field to stay.

Financial Strength, Manufacturing Experience

Temco is one of the Southwest's major post-war industrial firms. Gross sales in 1946 totaled more than $5,000,000.00 with more than $6,000,000.00 gross business scheduled for the current year. Temco is operated by former executives of North American Aviation in 1,000,000 square feet of the former N.A.A. plant near Dallas. Almost 2,000 skilled workers are employed in the air-conditioned plant and about 90% of them are experienced former North American Aviation employees. Temco's many different manufacturing activities help guarantee stability and security for both dealers and customers. Production of the Swift is not new to Temco, as 330 Swifts were produced on contract for Globe Aircraft Corporation, and 40% of the component parts for all Globe Swifts were Temco made.

A CAA Certified Operation— The Civil Aeronautics Administration has certified Temco as an aircraft manufacturer, conversion, and modification plant. Contracts are now in the shop for the U. S. Army Air Forces, and several domestic and foreign airlines, Fairchild Airplane Co., and for non-aviation commercial products. Temco has plenty of plant and plenty of "know how" to build real aircraft quality into the new Swifts.

Swift Prices Go Down!

Now you can get your new DeLuxe Swift for $3,750, or the Standard Swift at $3,250. Temco plans to build sales by keeping prices in line with competition and by giving you the most airplane per dollar.

Both models are ready for immediate delivery.

How can we reduce prices now? More than $2,000,000 were invested by the now dissolved Globe Aircraft Corporation in developing the Swift to its present state of perfection. With these heavy expenses already taken care of, Temco can produce the Swift at lower cost. These savings are passed along to you in the form of an even better Swift at a lower price.

Two important improvements on the new Temco Swifts are the Steerable Tail Wheel and (on the DeLuxe only) a Metal Top Canopy.

Service and Parts Are Available

Plenty of genuine Swift parts are in stock now. Parts and Service are offered through established dealers with factory service offered where dealer service is not available. Nation-wide Sales and Service organization is now being set up. Write for the name of nearest Dealer.

The Swift is the only airplane in its class approved by the Veterans Adm. as a secondary trainer for G. I. flight schools.

The Swift

To Swift Owners—So that you may be registered as a Swift owner to receive new Service Bulletins and other valuable information, you are invited to write immediately to Owner Service Department giving your name, address and the N. C. and manufacturer's Serial Number of your Swift.

TEXAS ENGINEERING & MANUFACTURING CO., Inc.

P. O. BOX 6191 A • DALLAS, TEXAS

Take a tip from a windshield wiper

—nothing equals Stainless Steel!

Made of U·S·S Stainless Steel, these parts weigh exactly one ounce. Clever engineering makes them less costly to manufacture, longer lasting, more attractive to the buyer.

WHEN you drive home tonight take a look at your windshield wipers. The chances are they're more than four years old. What do they look like now? If they're still shiny and bright, free from rusty stains and pitting you can be pretty certain that they're made of Stainless Steel.

How much *more* do you think it cost to make them of Stainless? We're willing to bet it cost nothing extra. Why? Because parts like these form faster and easier in Stainless Steel. They don't have to be plated either. And—because Stainless Steel is so tough and strong—thinner, lighter sections can be used to do the job.

"So what?" you say, "We're not making windshield wipers." Maybe not, but the same good reasons that make Stainless better for them also make it better for the hundreds of aircraft parts, large or small, where superior mechanical performance and greater endurance can be assured at little or no increase in cost.

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CAA Tests Slated For Convair Liner

Official CAA flight tests of the Consolidated Vultee "Convair Liner"—new designation for the Model 240—were scheduled to begin last week, following a month of CAA ground inspections. Robert Gross, CAA Sixth Region engineering pilot, tentatively has been named to do the certification flights, and James Ross has drawn the flight engineer assignment.

An earlier report that the new Convair transport had already begun tests stemmed from the fact that the company several weeks ago put the plane through CAA tests for its own information.

Modifications to the jet exhaust cooling system include a shortening of the exhaust pipe, which now terminates about two feet ahead of the wing trailing edge. The earlier installation carried the pipes completely to the trailing edge. Stainless steel troughs protect the trailing edge area that might otherwise be affected by the hot exhaust. Convair claims that this system, in addition to providing engine cooling at rest and in long climbs, produces a thrust of 160 lb. per engine at 2400 hp.

Convair has developed magnesium control surfaces, ordered by Pan American for its fleet, which save about 50 lb. per airplane. A static load destruction test conducted recently made on an experimental magnesium rudder showed the member to possess a strength slightly exceeding that of the comparable dural rudder.

CW, Union Sign New Wage Pact

A strike at the Columbus, Ohio, plant of the Curtiss-Wright Corp. was averted when an agreement was reached between management and the UAW-CIO after a 12-hr. session.

A spokesman for the company said the new wage agreement calls for wage increases of 10c. an hour and pay for six holidays for 1,800 employes of the airplane plant. Voluntary checkoff of dues was also included in the agreement.

The company said the raises will add $450,000 a year to the current payroll. A month previously the plant police received 10c. an hour through an agreement and the office and salaried employees got voluntary raises. This, together with the latest wage agreement, adds $900,000 a year to the payroll. The contract is for two yr. with a wage reopener after one year. The wages are retroactive to June 21 of this year.

There is a no-strike clause and a provision that in the event of a wildcat strike the union cannot be sued under the Taft-Hartley measure.

A week previous to the agreement the union authorized the bargaining committee to call a strike if negotiations bogged down. The union terminated its contract as of Aug. 4, but negotiations resumed and an agreement was finally reached.

The 1,800 workers affected are production, maintenance and cafeteria workers. There are 50 in the latter category. They received an additional 5c. an hour.

Goodyear Wins Suit

The Goodyear Aircraft Corp. of Akron has won a $306,000 judgment involving unemployment compensation contributions.

Judge Charles A. Leach of Common Pleas Court ordered the Ohio Bureau of Unemployment Compensation either to refund that amount to Goodyear or make restitution in future jobless contributions.

The BUC ruled that Goodyear should contribute 2.7 percent of its payroll for workers employed in two war plants in 1942 and 1943. Goodyear held it was entitled to a lower rate of 1.5 percent as provided under the merit rating system since it was an old and established firm and not a new factory.

Briefing Production News

► **North American Aviation,** Inc. has completed 25 of an ordered 250 P-82 Twin Mustangs. Three Navy FJ-1 fighters have been built and are undergoing tests. Two B-45 jet bombers are being assembled at the main plant on Los Angeles Airport, while a production line for this plane is being set up in an unused Douglas building at Long Beach airport.

► **Chance Vought Div.** of United Aircraft Corp. has completed its last F4U-4 and the first production F4U-5 was due to roll off the line earlier this month.

► **McDonnell Aircraft Corp.** has granted wage increases totaling more than $800,000 annually to 3,300 employees, members of the International Association of Machinists. Most employees got 12c. per-hour raises, with skilled tool and die makers receiving 17c.

► **Bell Aircraft Corp.** has delivered two Model 47B3 helicopters to British European Airways, and has shipped all but two of the eleven rotorcraft ordered by Trabajos Aereos Y Representaciones of Argentina.

► **Lockheed Aircraft Corp.**'s recent $2,500,000 order for 32 P-80B jet fighters for the Air National Guard, brings to 1,099 the number of As and Bs on order. Company is tapering off on employment due to approaching completion of Constellations on order. Current payroll of about 14,000 may drop to 13,000 or less by end of year.

► **Southwest Airmotive Co.**, Dallas, has acquired two additional large hangars at Love Field to more than double the size of its previous maintenance and storage facilities.

► **Boeing Aircraft Co.** has signed a contract providing for complete servicing, maintenance and modification of Alaska Airlines' Seattle-Anchorage fleet of five DC-4s and seven DC-3s. Work will be done by the year-old Boeing Seattle Service Center.

► **Consolidated Vultee Aircraft Corp.** has in the jigs an executive version of the Convair Liner, being constructed for an unnamed Mexico City customer. Company is canvassing the executive market.

► **Universal Aviation Co.** has been formed in Tulsa, with shops at the municipal airport, for aircraft modification. It has converted a Douglas A-26B, and has contracts for a B-17, 10 A-20s, seven B-25s and four C-54s. Company is headed by Donald H. Roberts, S. L. Huntington and Robert Dieter.

► **Northwest Industries Ltd.,** Edmonton, Alberta, has new contracts for airplane overhaul, repair and maintenance with the Canadian government and private operators which will boost employment to between 400 and 500.

► **O'Neil-Irwin Manufacturing Co.**, Lake City, Minn., has issued a 40 page booklet illustrating and explaining its line of DI-ACRO die-less precision duplicating machines. It is available on request from the manufacturer.

► **Gilfillan Bros.,** Los Angeles manufacturer of Ground Controlled Approach landing equipment, on Sept. 1 will open a GCA training school for the U. S. Air Force at March Field, Calif. First students will be 240 from USAAF and 12 from the Royal Canadian Air Force.

GE Equipping Six Transports

Contracts totaling $2,780,000 for aircraft equipment in six commercial transport planes have been received by General Electric Co.

Equipment contracts now on order include: $500,000 for the Douglas DC-6, $1,500,000 for the Boeing Stratocruiser, $310,000 for the Boeing Stratofreighter, $300,000 for the Convair liner, $100,000 for the Lockheed Constellation and $70,000 for the Lockhead XR60, military version of the Constitution.

This brings to a total of nearly 35,000,000 GE's equipment contracts, including $30,000,000 for Convair B-36a and $2,000,000 for Northrop YB-35 remote control sighting and turret armament, as well as turbosupercharger and alternating-current electrical equipment.

NEW AIRCRAFT

Fokker Completing New Trainer

Two or three-place Instructor for primary work nears flight test stage in fast-reviving Dutch industry. Company reports orders for 100.

Specifications and data include:

	Normal		Non-aerobatic	
Span	26	ft. 6 in.		
Length	36	ft. 11 in.		
Height	7	ft.		
Wing area	194	sq. ft.		
Gross wt	2,370	lb.	2,535	lb.
Useful load (2 with parachutes, or 3 without chutes)	395	lb.	530	lb.
Fuel (31 Imp. gal.)	238	lb.	238	lb.
Oil	27	lb.	27	lb.
Baggage	.....		20	lb.
Empty wt. (inc. electric starter and navigation lights)	1,710	lb.	1,720	lb.
Wing loading	12.2	lb./sq. ft.	13.1	lb./sq. ft.
Power loading	12.57	lb./hp.	12.7	lb./hp.
Max speed, sea level	134	mph.	133	mph.
Cruising speed	106	mph.	104	mph.
Flight duration, cruising speed	4.1	hr.	4.1	hr.
Range	310	mi.	425	mi.
Climb, to 3,300 ft. (1,000 M)	5.1	min.	6.2	min.
to 6,600 ft	12.1	min.	15.3	min.
to 9,900 ft	22.6	min.	30	min.
Service ceiling	13,000	ft.	11,000	ft.
Absolute ceiling	15,000	ft.	13,500	ft.
Takeoff run (with 6-mph. wind)	540	ft.	650	ft.

Nearing completion at United Dutch Aircraft Factories Fokker in Amsterdam is the new Fokker Instructor, a two-three place primary trainer.

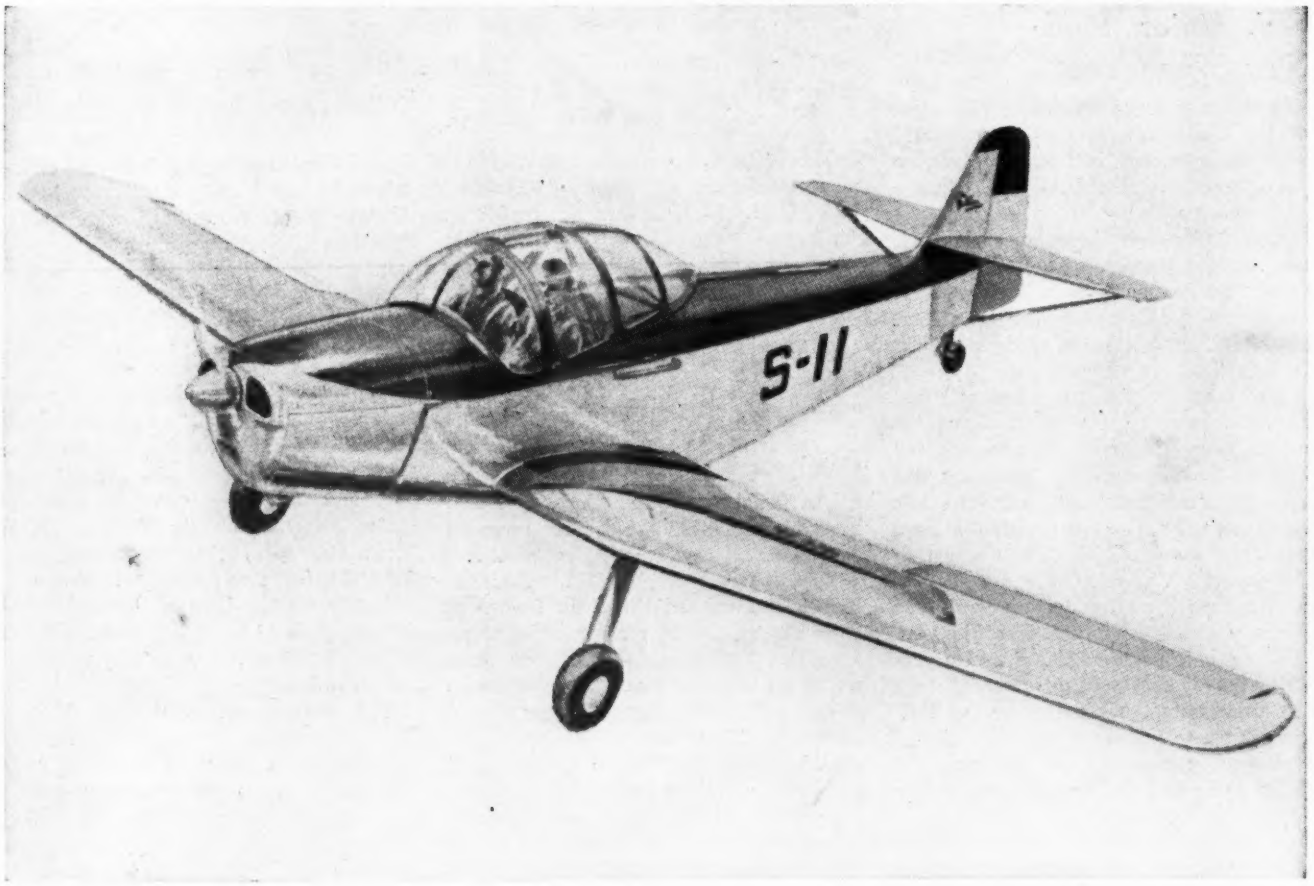
Normal seating is for two persons side-by-side, but immediately aft of the overturn structure a third seat of simple construction can be added for observation purposes. The bubble-type canopy slides aft for entrance and exit.

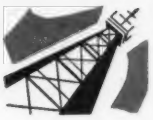
The all-metal cantilever wing is of single piece construction, carrying fabric-covered ailerons and manually operated metal flaps. Main landing gear, according to late reports, is of levered suspension construction, thus varying somewhat from the artist's conception shown here. Hydraulically operated brakes and steerable tail wheel are provided.

Fuselage is of welded steel tubular construction, fabric covered. Engine cowling is built up of easily removable panels to facilitate inspection and maintenance. The power plant, a 190-hp. Lycoming O-435-A, is mounted on a welded steel tube mount. An electric starter is provided as standard equipment.

Vertical fin and rudder are both of light metal construction, with the stabilizer having a single external brace to the fuselage. Rudder and elevators have light metal spars and ribs, fabric covered. Elevator trim tab is adjustable in flight; that on the rudder is adjustable only on the ground.

The company reports that Frits Diepen Vliegtuigen N. V. has ordered 100 of the type, and negotiations are under way with the Dutch government for further orders.





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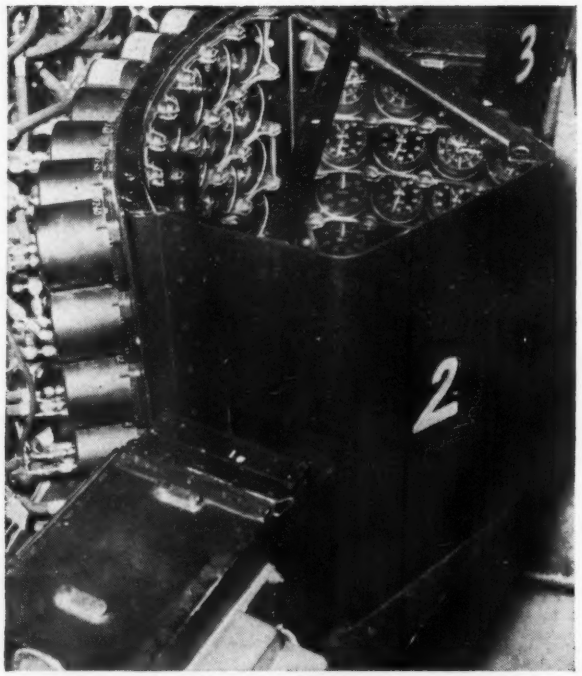
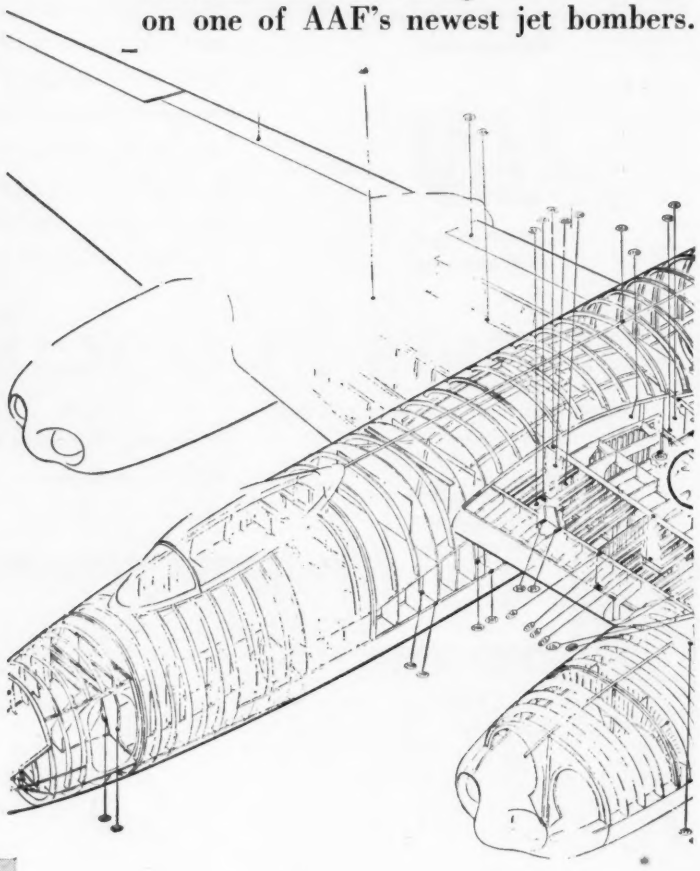
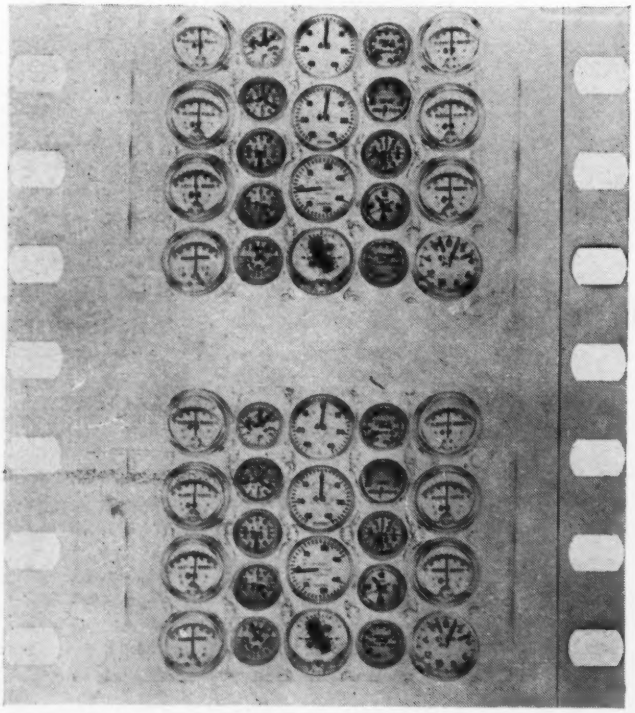
Recording Test Data on North American B-45

First story on methods of recording 28,800 instrument readings in one minute on one of AAF's newest jet bombers.

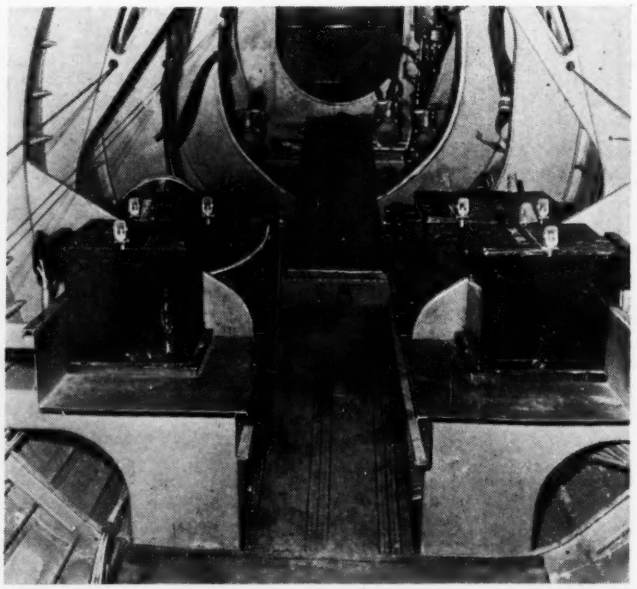


COMPACT RECORD: One of five photo-recorders, this unit is fitted in small space by use of mirror to reflect 35 large instruments. Camera (lower left) has electro-magnetic actuator and is mounted on adjustable rails for exact alignment. Five photo-recorder units cover total of 120 instrument dials.

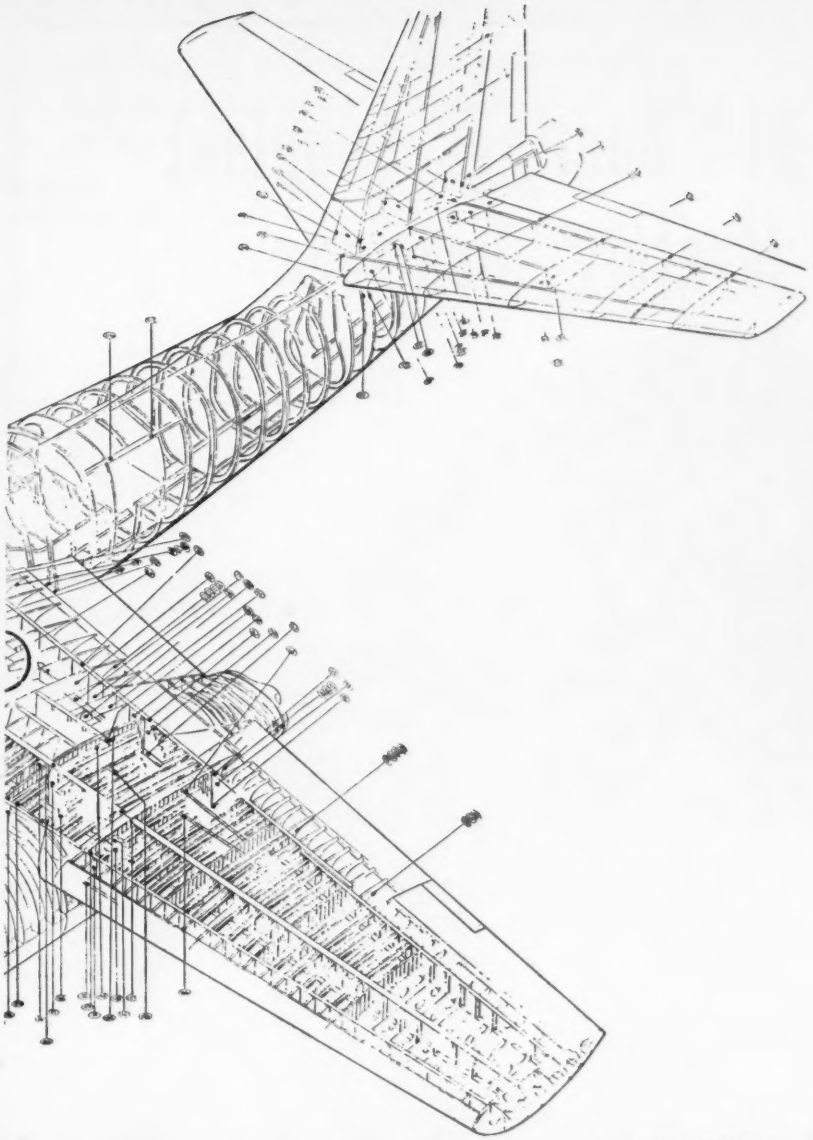


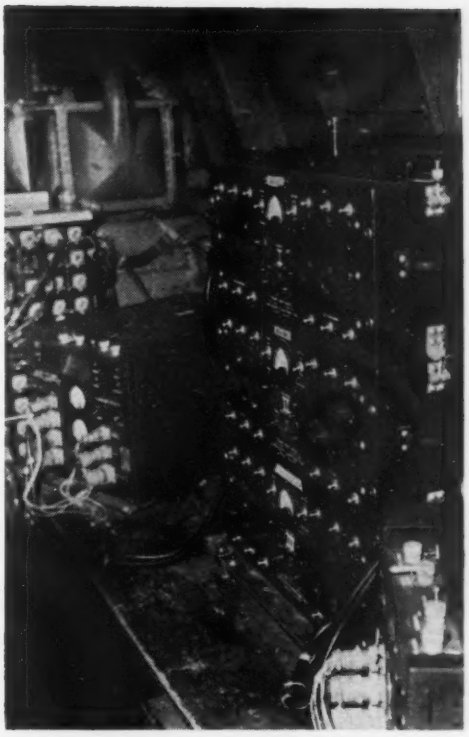


TYPICAL RECORD: Film strip from photo recorder shows in first and fifth vertical rows micro-ammeters measuring control forces. At bottom of fifth row is accelerometer measuring vertical force up to 12 G. Middle row dials give gyro instrument readings of yaw, roll, pitch, airplane attitude. Small dials give control surface angular displacements picked up by selsyn indicators.

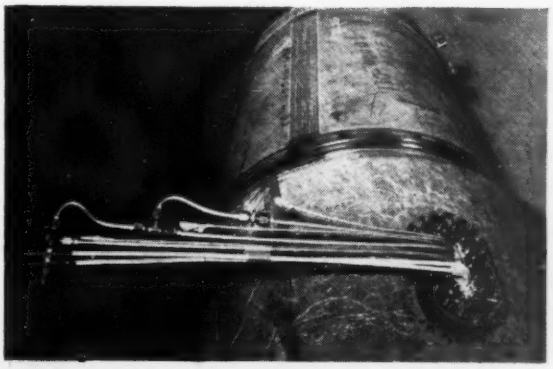


TESTING POWER: Supplemental electricity is required to operate recording oscillographs and provide necessary voltage for strain gages. For this purpose flight test B-45 mounts in tail section two 24-v. and four 12-v. batteries. Note cleanness of structural design in this first-published photo of interior structure of North American bomber.



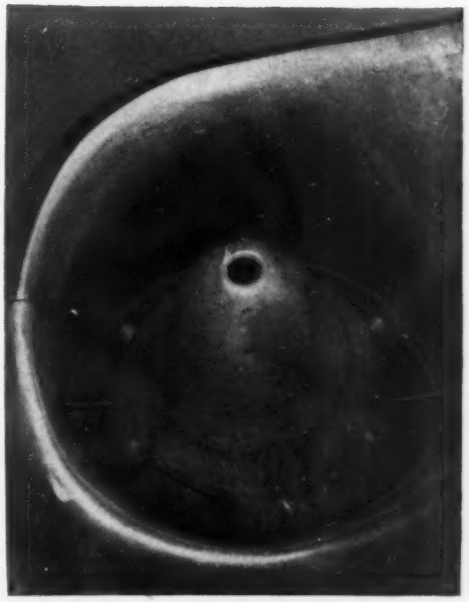


STRAIN GAGE RECORDING: Mounted between three Consolidated Engineering Corp. recording oscillographs are these three bridge-balance units, mounted on top of each other. Each bridge-balance has twelve separate channels and 36 cables from these units connect to selected points on strain gage terminal board seen in background.



MEASURING JET EXHAUST: Pressure tubes leading to stainless steel rake mounted in tail-pipe of B-45 engine are connected to sensitive-reading manifold pressure gages made by Kollsman. Gages are unusual and cover range of from 10 to 200 in. mercury, absolute. Gage dial has two pointers, larger making 19 revolutions covering 100 dial graduations per revolution.

SELSYN MOUNTING: Selsyn transmitters are linked by braided steel cables to B-45 control systems. To provide extreme accuracy of readings, each transmitter actually contains two selsyns, one geared to rotate at four times speed of other. On indicator dial in photo recorder one pointer makes four revolutions to one revolution of other pointer.



MEASURING INTAKE: Symmetrically-located pitot tube rakes are shown mounted within B-45 engine air inlet duct. For recording air flow at this point North American chose to connect tubes to F-1 sensitive air speed indicators rather than direct-reading pressure gages. Easier reading and greater accuracy was obtained.

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New Plant Practices Cut Costs

Salvaging of expensive hydropress pads and simplifying router operation give substantial savings in Ryan production.

Through a simple method, Ryan Aeronautical Co. now reconditions the worn rubber forming surface of a hydropress ram, greatly cutting operating costs and lessening procurement problem.

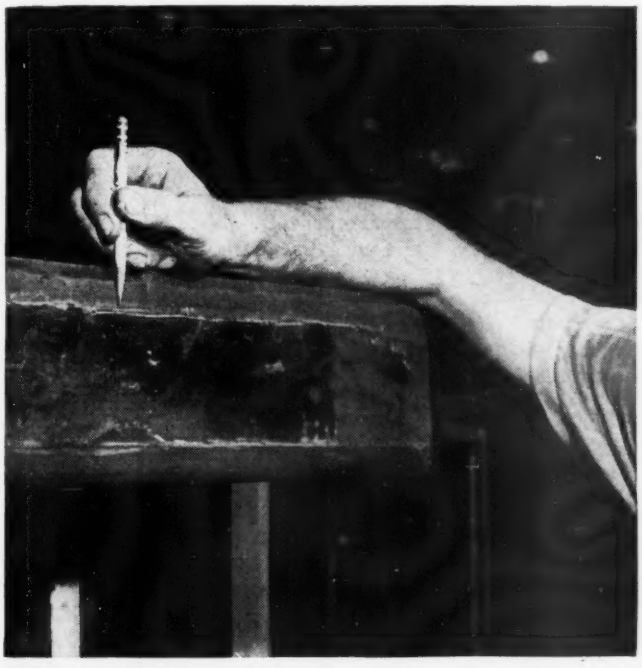
In normal operation, the rubber pad—six inches thick and weighing several hundred pounds—ultimately becomes badly chewed by the metal parts it forms. Usual procedure was to reverse the pad in the press, and when reverse side was worn, the pad was discarded.

Inspection showed that the pad center portion—about four inches thick, and comprising approximately two-thirds of the pad's mass—was practically unaffected by wear. To further utilize the unit, the chewed surface was ground down for about one inch (see left photo) and layer of new rubber vulcanized on each side of the pad, affording, essentially, a new unit. Reconditioning was suggested by company's R. W. Booth.

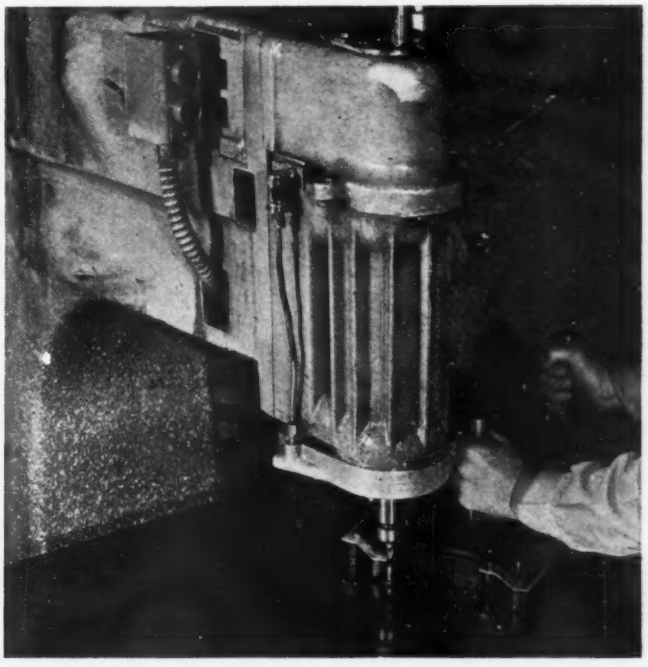
► **In another production study,** suggested by Willard Harpster, changeover to removable pilot tips on routers at Ryan reduced manufacturing costs and minimized damage to equipment.

Cutting sheet metal on the router is accomplished by feeding material to the bit —a revolving cutter. Pilot, consisting of cylindrical steel bar located in the machine table, and used as a guide for the cutting block, is an extension of a barrel locked in table (right photo). Formerly, when pilot was damaged, it was necessary to remove the entire barrel—a difficult job, frequently resulting in further damage to tool and pilot when latter was knocked out of holder.

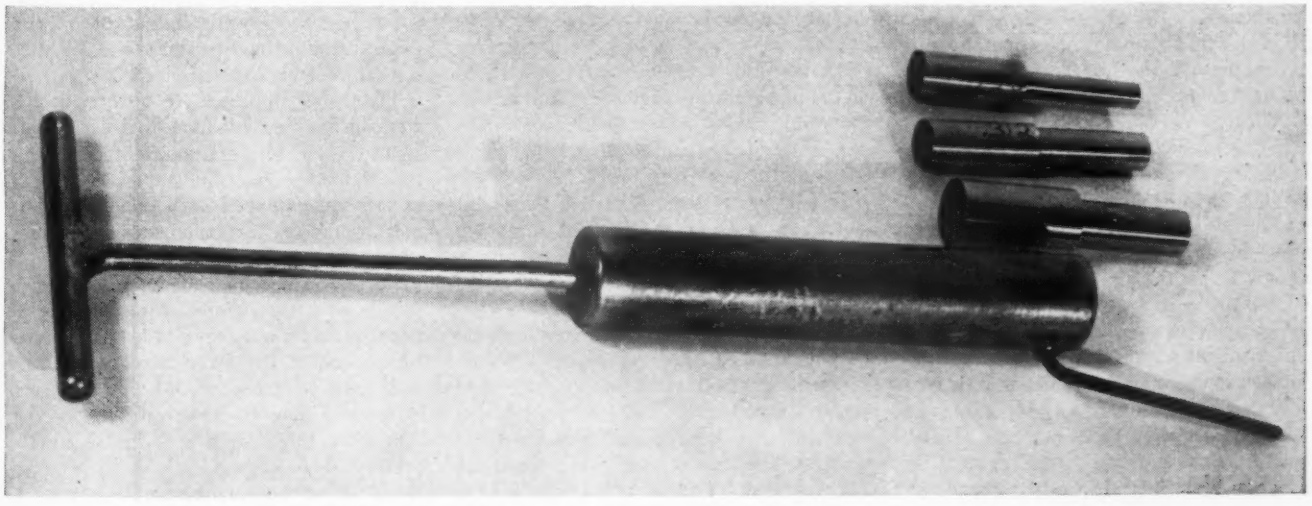
Pilot is now made with tip held in barrel by Allen set-screw (bottom). One side of the shank is slightly flattened to accommodate burr caused by the screw, which would otherwise bind the shank. Ejector is tapped from below for quick removal of unit.



INDICATED BY PENCIL is seam where 1-in. layer of new rubber is vulcanized to old hydropress pad to boost its life.



IN ROUTER OPERATION seen here, removable pilot tip contacts router block and guides work.



CLOSEUP OF ROUTER PILOT showing various removable tips, Allen set-screw and key, and ejector rod.

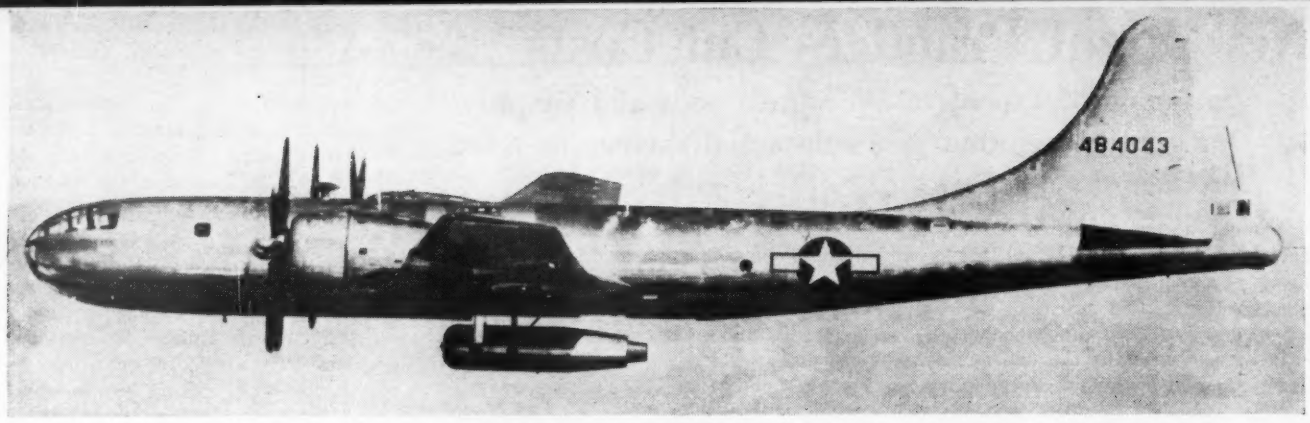


Fig. 1. Modified Boeing B-29 used as flying test laboratory with General Electric TG-180 (J-35) engine lowered to test position.

Flight Testing Gas Turbines

Procedures and recommendations for final step held necessary for complete engine evaluation.

By W. O. MECKLEY, *Aircraft Gas Turbine Div., General Electric Co.*

Introduction of the gas turbine for aircraft propulsion has brought new fields of testing procedures and techniques, and rapid development of new jet engine models has brought extensive testing programs to adequately evaluate and prove new designs.

To adequately test a turbojet requires that the engine be operated from sea level to 50,000 ft. pressure altitude, at air temperatures ranging from —70 F to +90 F, and at flight speeds as high as 700 mph. These conditions may be imposed upon an engine either by flight testing or simulating flight conditions in a wind tunnel. It has been found that to adequately cover early development needs of testing a new design in an entirely safe and economical manner, a succession of at least three different vehicles—the flying test laboratory, altitude wind tunnel, and aircraft installation—should be used.

These three vehicles are those generally used today for evaluating complete engine operation and performance. It is equally important to operate each component of the complete unit separately to obtain its basic characteristics.

▶ **Flying Test Laboratory**—Existing airplanes have been modified for the purpose of installing and operating a gas turbine where this engine is not necessary to maintain flight of the airplane. One such airplane (Fig. 1) is a B-29 modified to install a General Electric TG-180 (J-35) turbojet in the bomb bay. In this installation, the engine is housed inside the airplane when not in use, and is lowered below the airplane when operating.

Utilization of flying test laboratories to test gas turbines has proved to be a safe and expedient way to conduct necessary engine development testing under altitude conditions. The maximum contribution of such a test vehicle is to test new gas turbine models before any substantial amount of flying can be achieved in actual aircraft installations of the powerplant, and to explore a greater range of operating conditions not safe or possible in a single-engine airplane. Where important development engine components are available before the new engine is complete, it is often advisable to conduct flight tests of the components by utilizing some parts of older units to make up a complete engine. The main limitations of a facility such as this are its relatively low air speed and operational altitudes.

Items usually investigated in a flying test laboratory program are:

1. Investigate limitations of operation for various altitudes up to the minimum air temperature and pressure to be expected in the final aircraft installations of the particular engine, including investigation of such items as engine restrats, burner blowout, engine acceleration, and windmilling characteristics.

2. Establish limits of stability of various developmental engine control systems under flight conditions, including checking out new accessories and control system units.

3. Establish thermodynamic data for gas turbine compressor and turbine, with compressor inlet air temperature varying from sea level values to cold air at high altitude.

4. Establish safe operation of various methods of thrust augmentation such as water injection schemes; investigate induction system icing, and conduct initial flight tests on other miscellaneous items.

In addition to these items the flying test laboratory provides an excellent means of acquainting design personnel with the problems attendant to flying and with actual operation of their designs in flight.

▶ **Altitude Wind Tunnels**—A new turbojet can be installed either in a specially constructed wing and nacelle or in a modified aircraft installation, and the installation mounted in a wind tunnel where altitude pressure, temperature, and flight speed are all simulated. The best example in the world today of the ultimate to which simulated flight operation can be carried is the NACA Aircraft Propulsion Research Laboratory's Altitude Wind Tunnel in Cleveland.

Use of the altitude wind tunnel has been extremely valuable in extending the range of turbojet testing before installation in the final aircraft installation. Such a facility appears to be most valuable in complete performance evaluation and operation of specific engine designs after the development "bugs" have been eliminated in the flying test laboratory. Accurate readings of temperature, pressure, and air and fuel flows can be obtained easier than in the final installation.

The general engine items to be evaluated follow those listed for the flying test laboratory except that the performance, starting, acceleration, windmilling and fuel characteristics of a specific engine can be evaluated at higher altitudes and high simulated flight speeds. The tunnel is better suited than either the flying laboratory or aircraft installation to conduct fundamental work on such important items as induction system and engine inlet icing, thrust augmentation, and specialized instrumentation.

▶ **Aircraft Installation**—When the turbojet is finally installed in the airplane for which it is intended, its characteristics should be well evaluated and its operational limits well defined, so that initial flight tests of the new airplane can be carried on with a minimum of engine uncertainties. A major part of the initial tests will cover items such as investigation of takeoff and landing characteristics, airplane control and performance, and little time is available for specific engine tests.

Flight test airplanes are instrumental as completely as possible using automatic photo recorders and temperature recorders to obtain desired engine and airplane data and usually are equipped with oscillographs to measure rapidly fluctuating stresses and pressures. Space restrictions and absence of more than a minimum of human bservers usually limit the number of elements to be investigated on one flight far below that possible in either the flying laboratory or altitude wind tunnel.

Specific items to be investigated overlap somewhat those already evaluated in the previous two facilities. Items such as jet thrust, compressor pulsation, burner blowout, engine windmilling speed, restarts, and

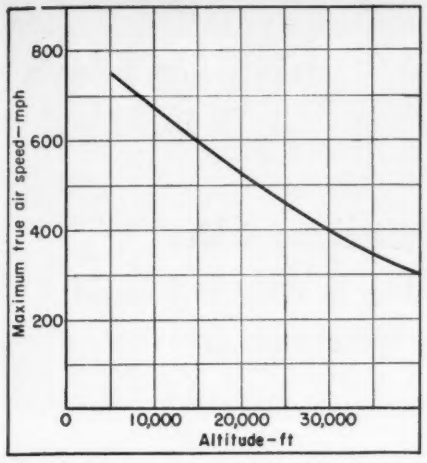


Fig. 2. Maximum airspeed for altitude starts with engine windmilling.

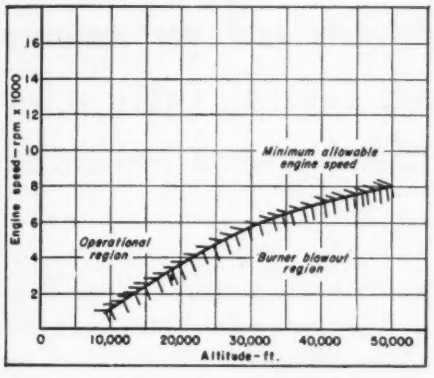


Fig. 3. Variation of allowable minimum engine speed with altitude.

accelerations may be influenced somewhat by the particular installation's intake duct and tailpipe design, and usually enough testing is done to determine what these differences, if any, are. Characteristic items requiring more attention in flight test are: temperature patterns in and around the engine compartment, flow conditions and pressure recovery in the intake ducts under different airplane altitudes, and performance of lubrication and fuel systems with respect to temperatures and pressures in the lines. This latter is important to insure satisfactory service during high altitude operation.

▶ **Gas Turbine Characteristics**—The following details are important items investigated

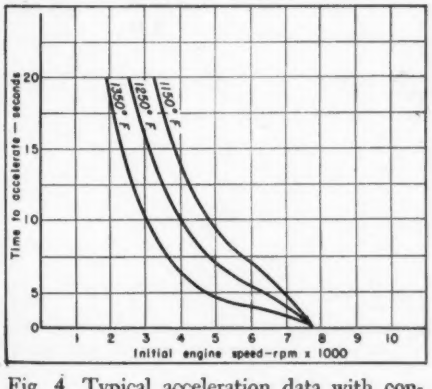


Fig. 4. Typical acceleration data with constant area jet nozzle, constant altitude. (Figures on curve are exhaust gas temperatures.)

in both operational and performance evaluation.

1. Starting and minimum speed operation; obtaining successful restarts in flight at high altitude is a critical turbojet problem. In general it may be said that increases in either altitude or flight speed reduces the probability that successful starts can be made. Fig. 2 illustrates this effect as obtained during wind tunnel tests of a turbojet now in production. It is important to obtain information concerning flight starting in either the flying laboratory or wind tunnel so that any limitation may be brought to light before engine flights in an airplane dependent on its operation are made.

Minimum idling speed of the engine is determined at that point at which one or more combustion burners cease operation. This minimum speed line (often called burner blowout line) is approached when the turbojet is throttled to reduce speeds. Safe idling speeds tend to increase rapidly with altitude and are affected unfavorably by high airplane speeds. A minimum speed schedule such as is shown on Fig. 3 is usually determined in either a wind tunnel or flying test cell prior to actual flight test.

2. Acceleration tests are conducted to determine the maximum rate of engine acceleration without exceeding engine tailpipe gas temperature limits and to determine maximum altitudes and minimum engine speeds for practical acceleration rates. The time required to accelerate the engine becomes greater with increasing altitude because, though the mass of engine to be accelerated remains constant with altitude, the force available for accelerating the turbine and compressor becomes less as the gas densities decrease. Fig. 4 and 5 show typical acceleration data obtained during evaluation.

3. Operation of a turbojet over a wide range of altitudes and ram pressures requires that the control system provide stable operation and automatic compensation for these changing conditions, so that manual control will not require a continuous adjustment to meet variables during a flight. Items necessary for evaluation are: stability of the system at all speeds and altitudes, determination of engine speed variation at a given position of the pilot's throttle with variations in plane speed and altitude, evaluation of operation of the maximum speed limiting governor, which should hold a specified limit regardless of plane speed or altitude, determination of satisfactory operation of control system at extreme temperature (at least −67 F).

4. Performance tests are necessary to confirm the basic overall design of a new turbojet, laid out usually by properly matching component efficiencies of compressor, combustion chamber, and turbine. Altitude and ram effects on a new design cannot be accurately evaluated and engine performance estimates either confirmed or modified as dictated by the test results until the engine is either flown or placed in a wind tunnel.

5. One of the most important phases of performance testing is the determination of

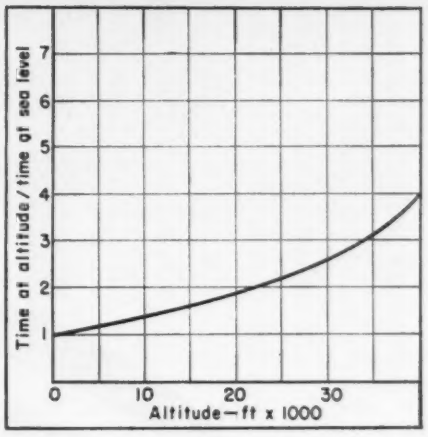


Fig. 5. Effect of altitude on acceleration time.

jet thrust at high altitudes and the effect of ram or jet thrust. Data obtained to date (Fig. 6) indicate that at low engine speeds, fuel flow to the engine is reduced as ram increases, while at or near rated engine speed, ram has relatively little effect. Because of the increase in jet thrust, with ram increases, the corrected specific fuel consumption is lower at all engine speeds under ram conditions of flight.

In connection with jet thrust, it is of real interest to the airplane designer to know also the net thrust of the installation which is determined by subtracting the momentum MV of the air flow passing through the engine (also known as ram drag) from the measured jet thrust. In general the effect of ram is to reduce the net thrust of the airplane and increase the net specific fuel consumption. This should not be interpreted as indicating the overall jet cycle to be less efficient at high speeds as when thrust horsepower is considered these trends reverse themselves.

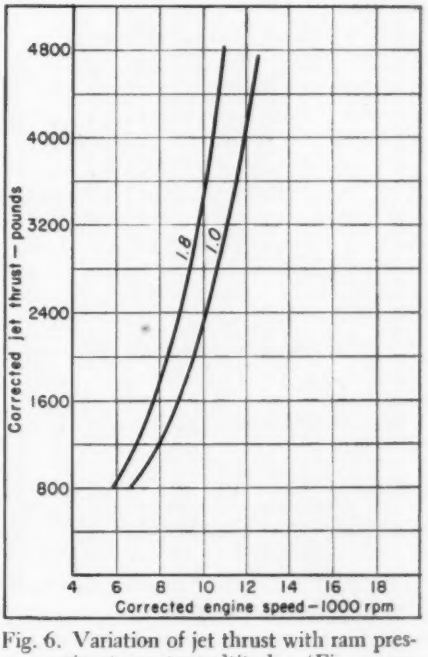


Fig. 6. Variation of jet thrust with ram pressure ratio at constant altitude. (Figures on curve are ram pressure ratios.)

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1000 Mc	8.5	.....
3000 Mc	17	.....
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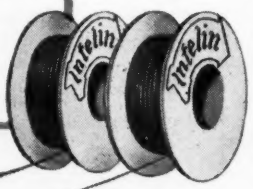

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Acceptance And Service Testing For Vibrator Power Supplies

Important steps in checking vibrators to insure compliance with exacting purchase and maintenance requirements for aircraft radio installations.

By W. E. PRICE, and E. M. HASSELL, Sperry Gyroscope Co.

Increasing importance of radio equipment in all types of aircraft is putting constantly greater stress on perfect functioning of all components. This is particularly true of vibrators, many of which today are discarded instead of being adjusted.

Many aircraft receivers and other types of electronic equipment depend on vibrator power supplies for converting low voltage aircraft supply to higher voltage suitable for operation of radio tubes in standard basic circuits. Some types of apparatus use vibrators for converting low voltage d.c. into a.c. power for particular applications. For practical designing of a vibrator power supply into a receiver chassis, a given power requirement will frequently require less space than an equivalent motor-generator supply. Electrical efficiency is materially higher but in the initial design is somewhat offset by the difficulty of obtaining interference-free operation in high sensitivity receivers.

Operational conditions of a vibrator power supply must be better controlled as to overload, input, impedance, transformer losses, buffing, and filtering components than is normally required with a motor generator. Because of transformer iron characteristics and choice of buffing components to meet all service, normal regulation of a conventional vibrator pack is poorer than a generator. This necessitates that the vibrator pack be operated under a relatively constant load. Proper power source must be maintained so that the vibrator looks back into an extremely low impedence circuit. If this requirement is not met, as when accidentally operating equipment on the aircraft's generator, the vibrator contacts will spark violently, and waveform will be degenerated into what may be only interpreted as hash. This condition may be partly corrected by installation of very high capacity electrolytic capacitors across the supply terminals; but under normal conditions, the power factor of such capacitors is sufficiently high so that a full correction of source impedance to the vibrator cannot be obtained. Vibrator transformer iron losses are basically a matter of design changes achieved by operating the iron at low flux density.

Vibrator application and type may be roughly divided into three groups—(1) simple primary vibrator with a tube rectifier for the high voltage, (2) synchronous or self-rectifying type, and (3) a.c. supply or precision power vibrator, shown in Fig. 1.

► **Precision Vibrator Requirements**—To assure uniform and trouble-free operation, rather exacting purchase specifications must be established for each particular type of vibrator required. A brief list of purchase requirements for a 100-cycle precision vibrator has been established as follows:

Type—Interrupter vibrator, 12v. drive coil.

Input voltage—10.6 to 16v. Starting voltage should not exceed 8v.

Input current—The power contacts should safely handle 6 amp.

Frequency—The reed should vibrate at 100 cps. with these tolerances:

1. At room temperature and 13.25v. input, +.8, −1.2 cycles; and at 10.6 and 16v. +1., −1.5 cycles.
2. At −40 deg. C., not more than 3.0 cycles higher than frequency at room temperature, but not exceeding 102.5 cps. at 13.25v. input; nor exceeding 103 cps. at any input voltage from 10.6 to 16.

Vibration—When subjected to vibration at any frequency from 10 to 55 cps., with an amplitude corresponding to an acceleration of 9G's, there should be no damage, or change in electrical specifications.

Life—After 500 hr. of operation at 13.25v. input at room temperature, it should meet same specifications as required of a new unit.

Sealing—The unit should be sealed to exclude dust and insure freedom from damage

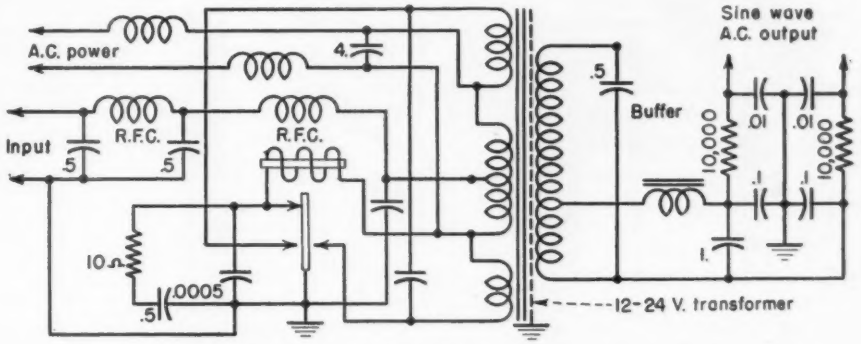

FIG. 1. SCHEMATIC DIAGRAM of a.c. precision power vibrator system.

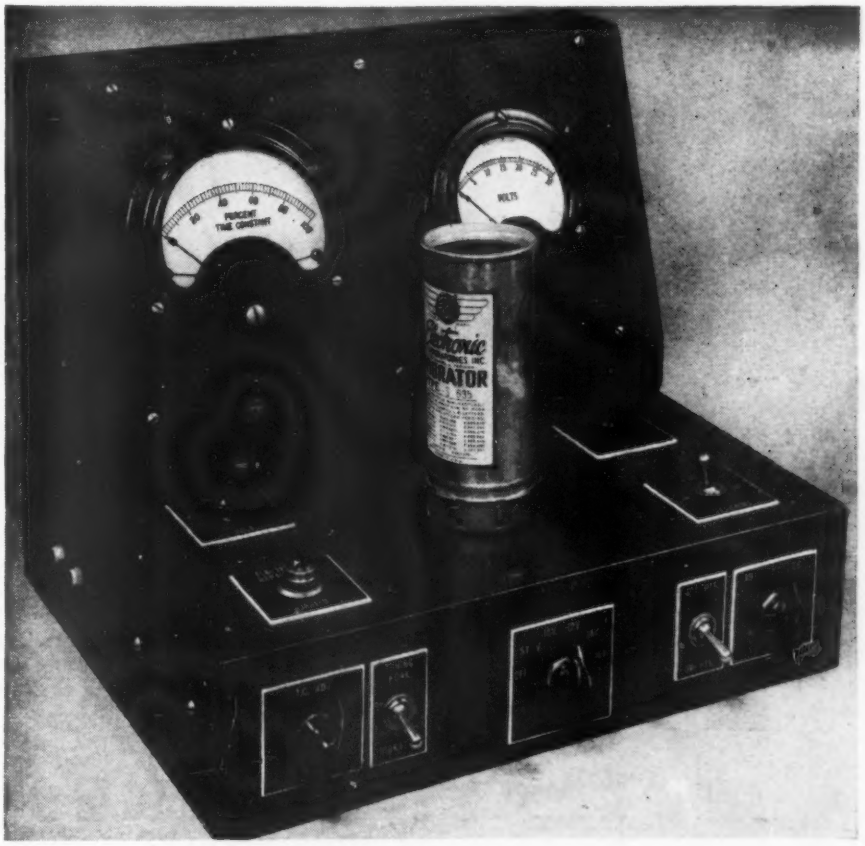

FIG. 2. TEST SET for checking a.c. precision vibrator.

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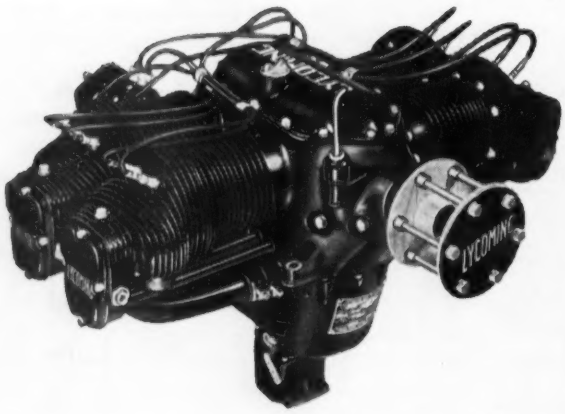
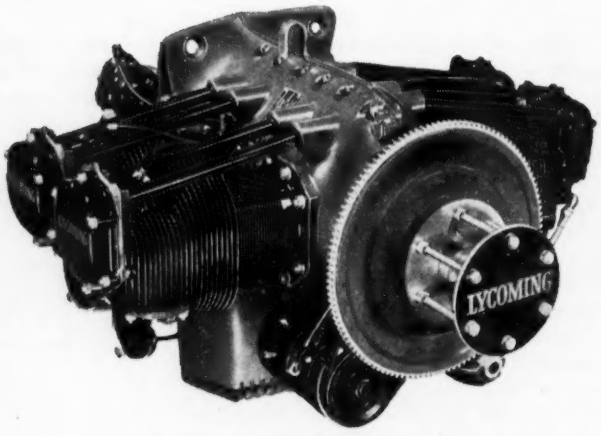


Lycoming Model 0-155
Normal Rated 65 BHP



Lycoming Model 0-235-C
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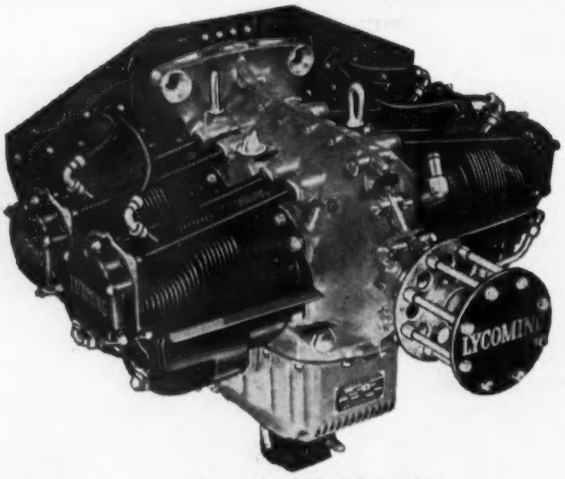
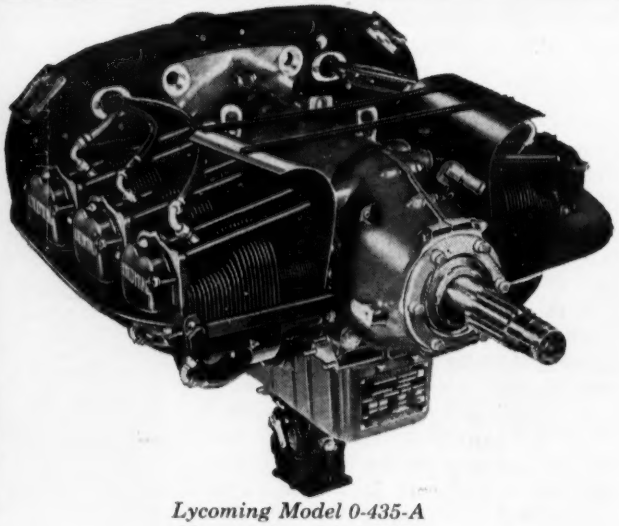


Lycoming Model 0-290-A
Normal rated 125 BHP



Lycoming Model 0-435-A
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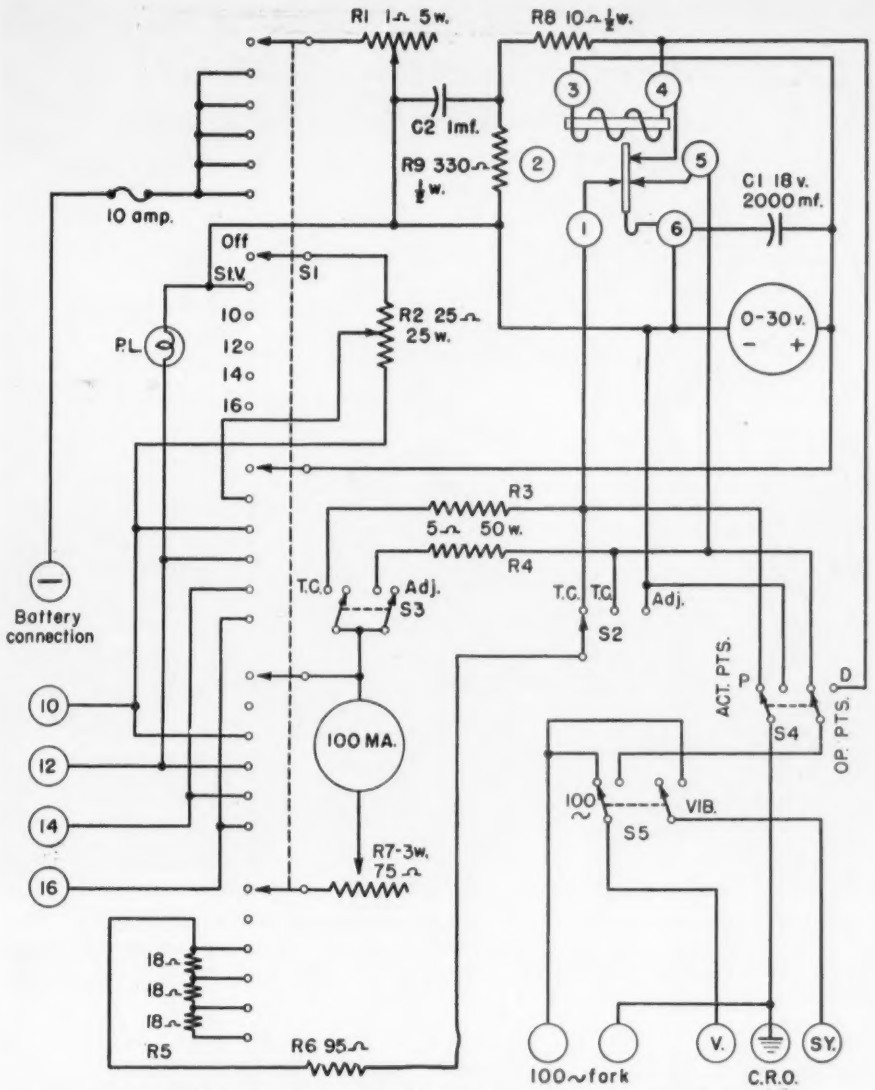


FIG. 3. SCHEMATIC DIAGRAM of test set for precision vibrator.

in normal handling. All base pins should be filled with solder. Packing between the vibrator and its container should be of rubber, or equivalent, and sufficiently thick so that the frequency when the vibrator base is clamped does not differ by more than ¼ cps. from the frequency when the base is not clamped.

Plating—The container should be made of tinplate, or plated, to insure freedom from rust or corrosion in protected service.

Contact chatter time—This is defined as the duration of the off-interval of a break which reaches zero voltage axis during the interval when power contacts are closed. Chatter time on one side should not exceed 15% of the total closed contact time. Meas- 13.25, and 16v.

Time Constant—Ratio of closed contact time of each contact to the time of one cycle of vibration should be from 36 to 44% at 13.25v. input, and from 36 to 46% at 10.6 and 16v.

► **Vibrator Test Methods**—Specifications are formed in such a way as to assure meeting both the requirements of the particular equipment and such certification tests as may be applied. Original acceptance and maintenance tests of vibrators may be normally conducted with the same apparatus and in accordance with general specifications. A test set suitable for checking a vibrator of the type previously described in the purchase specification is shown in Fig. 2. Other components required for this test are a frequency standard (in this case a General Radio precision fork) automobile-type batteries, transformer, and a 5-in. oscilloscope. The schematic circuit is shown in Fig. 3.

Testing vibrators for plate supply applications does not require the precision of a unit used for most a.c. power applications. In construction of such a plate supply power pack, the load should be adjusted to maximum that may be encountered in the use of the vibrator and quality of the unit established by its output voltage and wave pattern. Proper wave pattern for a synchronous-type vibrator is shown in Fig. 4. Departure from this wave pattern may indicate contact break during a normally closed cycle or contact bounce as shown by the dotted lines. Either contact break or bounce will create excessive sparking with resultant short vibrator life and high electrical interference. Distortion of contact springs may cause primary and secondary contacts to close in improper sequence resulting in output loss and high contact sparking.

Purchase and application requirements of the precision vibrator are most exacting; hence its test methods will be described, with reference to the test set shown in Fig. 2, together with the auxiliary components.

Starting voltage—Rotate R2 (Fig. 3) to minimum voltage and place SI in St. V. position. Advance R2 until the reed starts —must start at less than 8v.

Frequency—Switch SI to 14 V. and adjust R1 for 13.25v. input with S3 closed to TC, and S4 to P. Switch S5 to 100 cycles and set oscilloscope controls for external synchronization with the lock-in control at 0. Carefully adjust the oscilloscope sweep control until the pattern is at rest. Switch S5 to VIB. and advance the synchronization control to about 30 on the dial. With a stopwatch, obtain the time required for 10 cycle-patterns to move off the 'scope face. By reference to Fig. 5, the difference in cps. of the vibrator from the fork may be obtained. With a standard 'scope, drift to the right will be caused by frequencies below 100 cycles and drift to left will be indication of frequencies below 100 cycles.

Adjust S1 and R1 in combination to obtain an input of 10.6 and 16v. and repeat frequency test. Frequently recheck sweep frequency of oscilloscope against fork to prevent drift.

Time Constant—S1 and R1 are adjusted for 13.25v. input. Close S3 to TC, S4 to P, an S5 to VIB. Adjust R7 for full scale with S2 and ADJ. Switch S2 to vibrator point 1 and then to 5 (TC and TC) and read time constant directly on the milliammeter. Repeat at 10.6 and 16v.

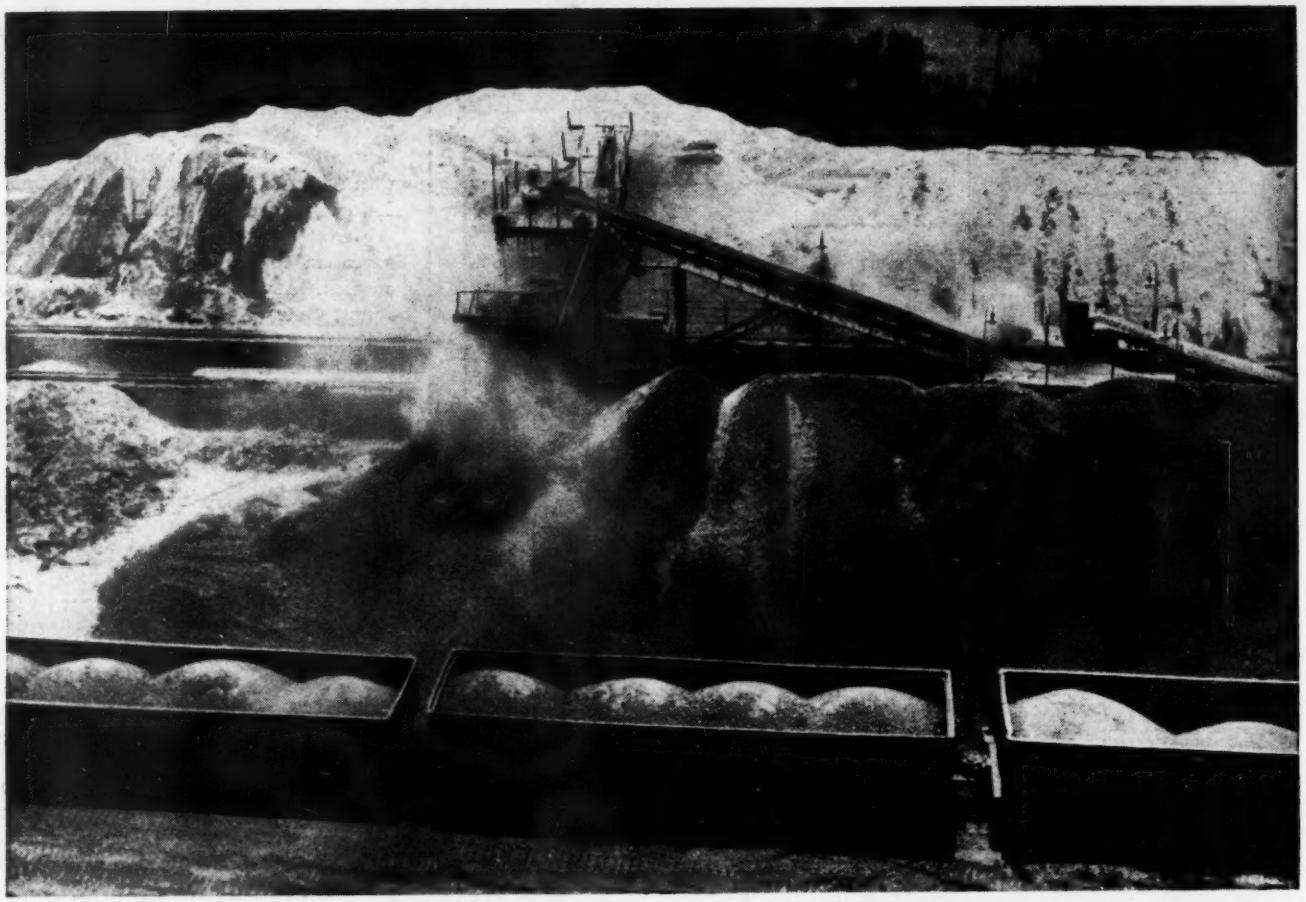
Chatter—With the switching arrangement used for time constant check, inspect the waveform developed across the load resistors with S4 on ACT. PTS. Pattern should be square and have flat lines at the top and bottom as shown in Fig. 6. Fuzziness or breaks indicate that power contacts are bouncing or not closing properly. By use of a squared screen on 'scope, determine that total break time does not exceed 15% of total half cycle time.

Switch S4 to OP. PTS. and observe pattern developed by the reed drive contacts. Pattern should be symmetrical and free of breaks or fuzziness.

In original acceptance tests of these vibrators, they are also given a brief operating test—oven-heated to 165 deg. F. and thoroughly tested hot. They are then cooled to room temperature and retested to the same specifications.

► **Service Checks**—Following is a summary of maintenance checks which may be performed, effect of a given malfunction on equipment operation, and adjustments that may be made toward correction. (These adjustments may be made by removing the dust cover of the vibrator—usually requiring a special circular soldering bit.)

(*Turn to page 36*)



1. Bauxite from South American deposits is unloaded and stockpiled at the Baton Rouge plant of The Permanente Metals Corporation, where it is converted to *alumina*. The plant, located on the Mississippi River, comprises 34 buildings on a 318-acre river site, is capable of turning out one billion pounds of alumina per year. It requires four pounds of bauxite ore to make two pounds of alumina.

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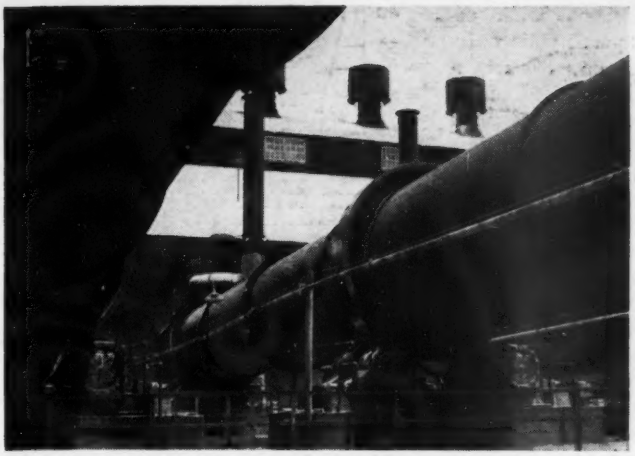
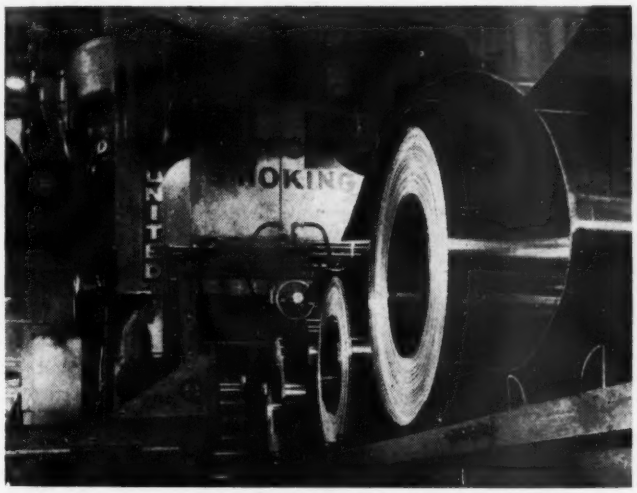


2. It isn't alumina yet—but this view in the Baton Rouge plant shows the final step in processing. These giant rotary kilns operate at 1800 degrees F., and cook the alumina hydrate into snow-white alumina powder. This alumina is then loaded into box cars and goes by rail to Permanente Metals' reduction plants at Spokane and Tacoma, Washington, where it is converted into basic aluminum.

3. Spokane, Washington, is the home of the reduction plant of The Permanente Metals Corporation, where alumina is made into basic aluminum. Another reduction plant, at Tacoma, increases the supply needed to keep the Spokane rolling mill operating at capacity. Reduction process requires tremendous power. Metal is cast into pure aluminum pigs, then sent to rolling mills for remelting and alloying.



4. The rolling mill at Spokane is capable of producing more than 288 million pounds of aluminum yearly. Two-ton ingots of alloyed aluminum are hot-rolled into long strips. Cut into sheets, the metal is cold-rolled to proper specifications (above). Careful handling and constant testing assure outstanding quality. This plant comprises 53 acres. Plate, sheet and strip are loaded directly into cars for shipping.

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Start voltage—High battery loads, such as engine cranking and radio transmitter operation, will frequently lower battery supply below the point where radio equipment can be expected to function properly. To meet this service conditoin, aircraft vibrators must vibrate at a very low voltage, else the reed may be pulled to one side so that a power contact closes the battery circuit through the very low resistance winding of the power transformer, resulting in a blown fuse or breaker. Starting voltage can be controlled by adjusting drive contact spring to place the reed end closer to the drive coil. Contacts may be polished with relay tool and squared by adjusting of contact supports.

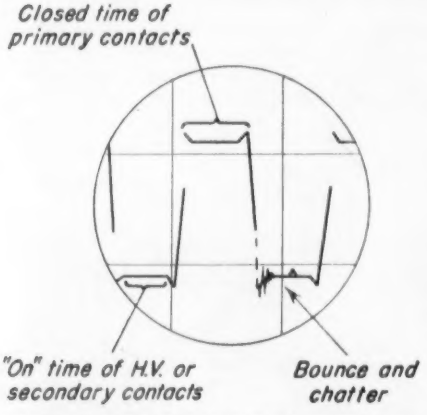

FIG. 4. PROPER WAVE PATTERN for synchronous type vibrator.

Frequency—The precision vibrator described is used in an automatic radio direction finder which is phase operated, requiring a high frequency accuracy to obtain optimum apparatus performance. Straight a.c. power requirements may well tolerate a frequency drift of ±5% while plate supply vibrators should be held to ±10% of design frequency. Variation beyond this limit will decrease buffing efficiency with increased contact wear. Reed frequency may be adjusted by adding or removing a bit of solder from free end of the reed.

Time constant—Percent of total cycle time that the power contacts are closed is basically a design characteristic which must be held to reasonable limits of design center to insure ample power output, low contact current, and proper frequency vs. input voltage characteristics. If time constant is too high, decrease spacing between the power contacts by bending their support springs while keeping contacts parallel. After each adjustment, recheck frequency at standard voltage and ±20% voltage. In the precision vibrator discussed, the power contacts are in parallel, hence, care must be exercised to insure that both pairs contact at once; otherwise, a twist will be placed in the reed tension, rendering the vibrator very unstable.

Chatter—Contact chatter or bounce may take several forms. Frequently, contacts will bounce at the time of closing and cause fuzz in the pattern at the beginning of each half cycle. In other instances, wiping action of the contact when dirty or pitted may cause a break in the middle of the closed time pattern. This contact noise should be kept to a minimum since it may well be a source of contact sparking, with resultant contact burning and interference in the equipment. A large break in the center of closed contact time will upset buffing action with serious contact sparking. Points may be cleaned and squared with very thin, fine flat file. Ascertain that contacts close flat, and check that they remain parallel through normal swing of the reed by pushing the reed at free end through normal travel arc.

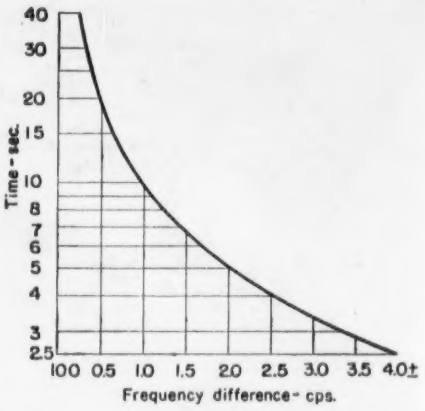

FIG. 5. TIME-FREQUENCY chart for comparing vibrator and fork cps. difference.

Large power vibrators are expensive and are usually well constructed so that minor repairs can profitably be made to obtain good service life. In routine maintenance overhaul, it is well to test to a standard of performance on a test jig, and again inspect vibrator and its associated power unit circuits with an oscilloscope before releasing equipment to the line. In resistance-capacitance buffer circuits, the capacitor may short and damage its associated series resistor without blowing the equipment circuit protection; but the vibrator is then working under a serious contact overload. Some position type resistors will short-while others will open under severe overload. Oil-filled capacitors have been known to develop high leakage under operating voltages, but will check properly on service type capacity testers. It is advisable to maintain a close inspection on primary circuit connections and plugs to insure that heating will not occur at some point to create a high resistance supply source.

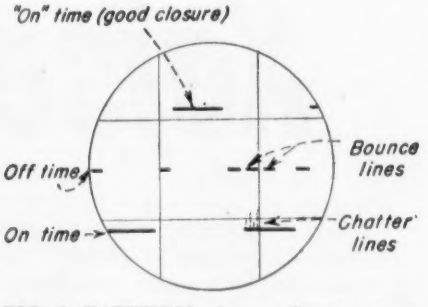

FIG 6. PATTERN of a.c. vibrator, across resistive load.

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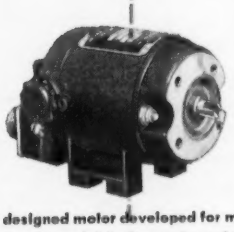
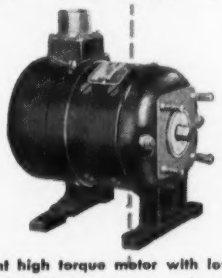
an advantage of special application

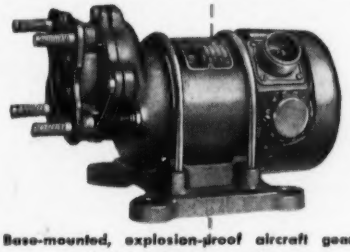
Lamb Electric MOTORS



Compactly designed motor developed for metering pump and special instrument service.



Intermittent high torque motor with low weight factor is adaptable to many general applications.



Base-mounted, explosion-proof aircraft geared fuel transfer pump motor.

Specially designed for each particular application and with thorough dependability built into every part, Lamb Electric motors have established a reputation for long, trouble-free operation. In addition to *special application*, thorough engineering and exacting manufacture contribute to the superior performance of Lamb Electric motors.

THE LAMB ELECTRIC COMPANY
KENT, OHIO

This small sturdy motor can be readily adapted to a wide range of industrial applications.

Universal motor, can be used on wheel spinners, portable pumps, grinders and other applications requiring high dependability.

Typical applications for this motor: industrial vacuum cleaners, agitators, sirens and colloid mills.

Lamb Electric

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ENGINEERS, for basic information about Sirvene, you may have a copy of "Engineering with Sirvene," free, by writing SIRVENE DIVISION, Dept. 1227

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Sirvene begins in the mind of an engineer . . . it grows from the need for a special pliable part to complete his mechanism. It is specially compounded from oil resisting elastomers in Chicago Rawhide Laboratories to achieve required physical characteristics, then molded to precise design specifications. The finished Sirvene part meets *exactly* the engineer's demand for flexibility or hardness, resistance to temperature extremes, dryness, wear, age, oil, water, or other solvents. Sirvene parts deliver dependable performance under the most difficult operating conditions. For the solution to your pliable parts problem—consider Sirvene *first*.

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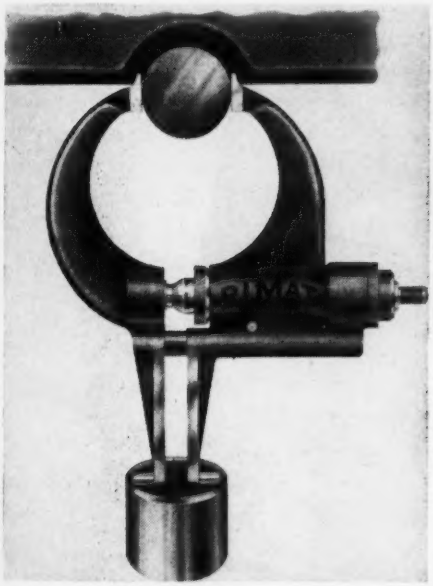
NEW AVIATION PRODUCTS

Engine-Work Micrometer

Rimat Duplex micrometer is reported as particularly suitable for aviation engine work. Made by **Richards Machine Tool Co.**, 124 S. Isabel St., Glendale 5, Cal., instrument



can measure crankshaft bearing sizes and test crankshaft for roundness without removal of shaft from engine block. With same setting, bearing insert can be checked for size and fit, thus eliminating possibility of error, either through faulty measurement or mismarked parts. English or metric measurements are optional.

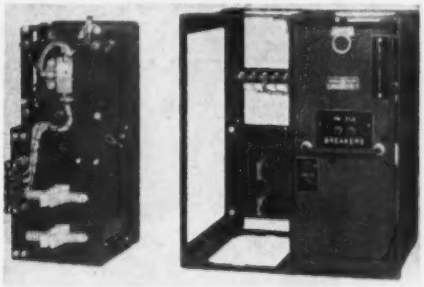
Rivet Shield Stops Marring

Dishing, dimpling, ringing, and denting during flush riveting is reported eliminated with use of No-Mar rivet shield offered by **Aircraft Tools, Inc.**, 2306 E. 38th St., Los Angeles 11, Cal. Shield is also stated to avoid cracking tendency encountered in more brittle types of material, such as SRT, and

it is said to be notably effective on extra thin sections and convex surfaces. Construction is of high grade tool steel, with face hard chrome plated to a mirror finish. Length of shield is 3 in., and driving set inside has .401 Parker taper shank. Device fits on barrel of any standard make pneumatic rivet hammer.

Grouped-Panel Power Center

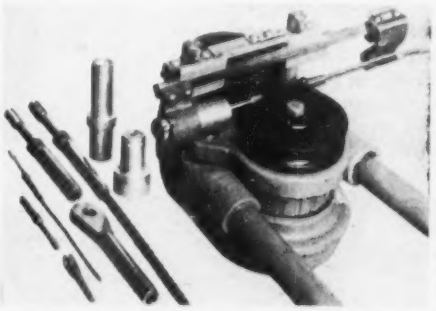
In new generator power center for aircraft, all control and protective equipment is grouped together in small removable panels. Made by **Aviation Div., General Electric Co.**, Schenectady, N. Y., center contains voltage regulator, reverse current relay, directional circuit breaker, power disconnects, control disconnects, and control circuit protection equipment. Individual panel weight is maximum of 15 lb., and each panel is 6⅛ in. wide, 14 in. high, and 10¾ in. deep. Any combination of panels can be



obtained, and they can be arranged as desired. Outgoing power bus can be supplied, as well as bus sectionalization with correct circuit breaker protection.

Aviation Cable Swager

Portability and simplicity of operation are features of steel cable swaging machine manufactured by **James R. Kearney Corp.**, 4224-42 Clayton Ave., St. Louis 10. Provided is powerful rolling and compressing



force that roll-swages eyes, jaws, turnbuckles, etc. Clutch transforms reciprocating handle action into rotating motion of rolls. For use in both aviation manufacturing and maintenance, machine will handle steel cable from 1/16 in. to ½ in. dia.

Information Tips

Properties and Uses of Nickel Alloys

"Nickel and High Nickel Alloys" is compressed handbook and guide being distributed by **The International Nickel Co.**, 67 Wall St., New York City 5. Author is Dr. Norman E. Woldman, consulting metallurgical engineer and former chief metallurgist for Bendix Aviation Co. Material on Monel, Inconel, Illium, and the Hastelloys is included, and modern fabrication and finishing practices are considered.

Portable Electric Cleaner-Blower

New electric cleaner-blower stated to feature both portability and increased cleaning action is publicized in circular from **Ideal Industries**, Sycamore, Ill. Heavy duty model is powered by 1½ hp. motor, blows air at velocity of 25,500 ft. per min., and weighs 14½ lb., while medium duty type has ⅝ hp. motor, displaces air at 19,000 ft. per min., and weighs 9½ lb. Units have four-purpose capacity—vacuuming, blowing, spraying, and drying.

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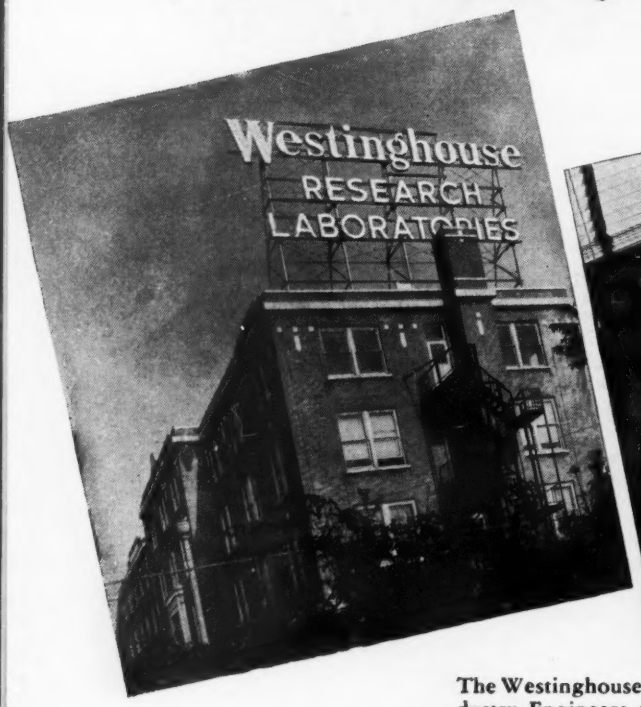
Here's Teamwork...



Center of all Westinghouse research activities is the laboratory at East Pittsburgh where a staff of 200 explores new and better methods of solving the problems of aviation.

The Westinghouse Aviation Industry Engineers travel in the field to act as consultants on special aircraft problems.

Westinghouse research, engineering and modern production facilities produce the electrical equipment that contributes to the fine performance of today's planes.

COURTESY BOEING AIRCRAFT CO.

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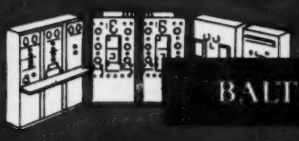


BALTIMORE

PRODUCTS: Radio and electronic equipment.

RESEARCH: Development of airborne and ground radio and radar equipment.

SHARON

PRODUCTS: Alnico V permanent magnets for electronic devices, synchros, etc.

RESEARCH: Magnetic materials and their application in transformer design.

NEWARK

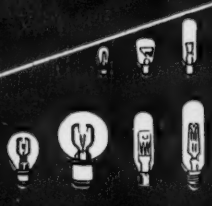
PRODUCTS: Aircraft electrical instruments.

RESEARCH: To provide ultimate in accuracy needed for aircraft instruments.

CLEVELAND

PRODUCTS: Lighting equipment to meet every airport requirement.

RESEARCH: Development and testing facilities.



BLOOMFIELD

PRODUCTS: Lamps for every aircraft, airway and airport lighting job.

RESEARCH: Continuing search for more and better light output at lower cost.

That promises new achievements in aviation . . .

. . . and better aircraft products for you

Teamwork is the secret of Westinghouse superiority in a wide range of aircraft products. Teamwork in the form of co-operative engineering and manufacture between 11 plants co-ordinated with one another and through a central headquarters. And in these vast resources lies an important advantage for you. For here are the knowledge, the experience and the facilities to engineer and produce better aircraft products . . . faster and at minimum cost.

Westinghouse equipment for the aviation industry covers a wide range of mechanical and electrical units or parts, for both ground and air-borne application. And all of this equipment —from tiny aircraft lamps to powerful turbo-jet engines and from radio and radar to giant wind tunnels—is contributing to safer, swifter and more comfortable flight.

The illustration below indicates the magnitude of the Westinghouse organization and how it is harnessed together to assist the aviation industry toward even greater achievement in the realm of flight.

This is why Westinghouse is your best source of supply for your aviation needs. For the complete story on "Westinghouse in Aviation" ask for your copy of Booklet B-3775. Call your local Westinghouse office or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-94760

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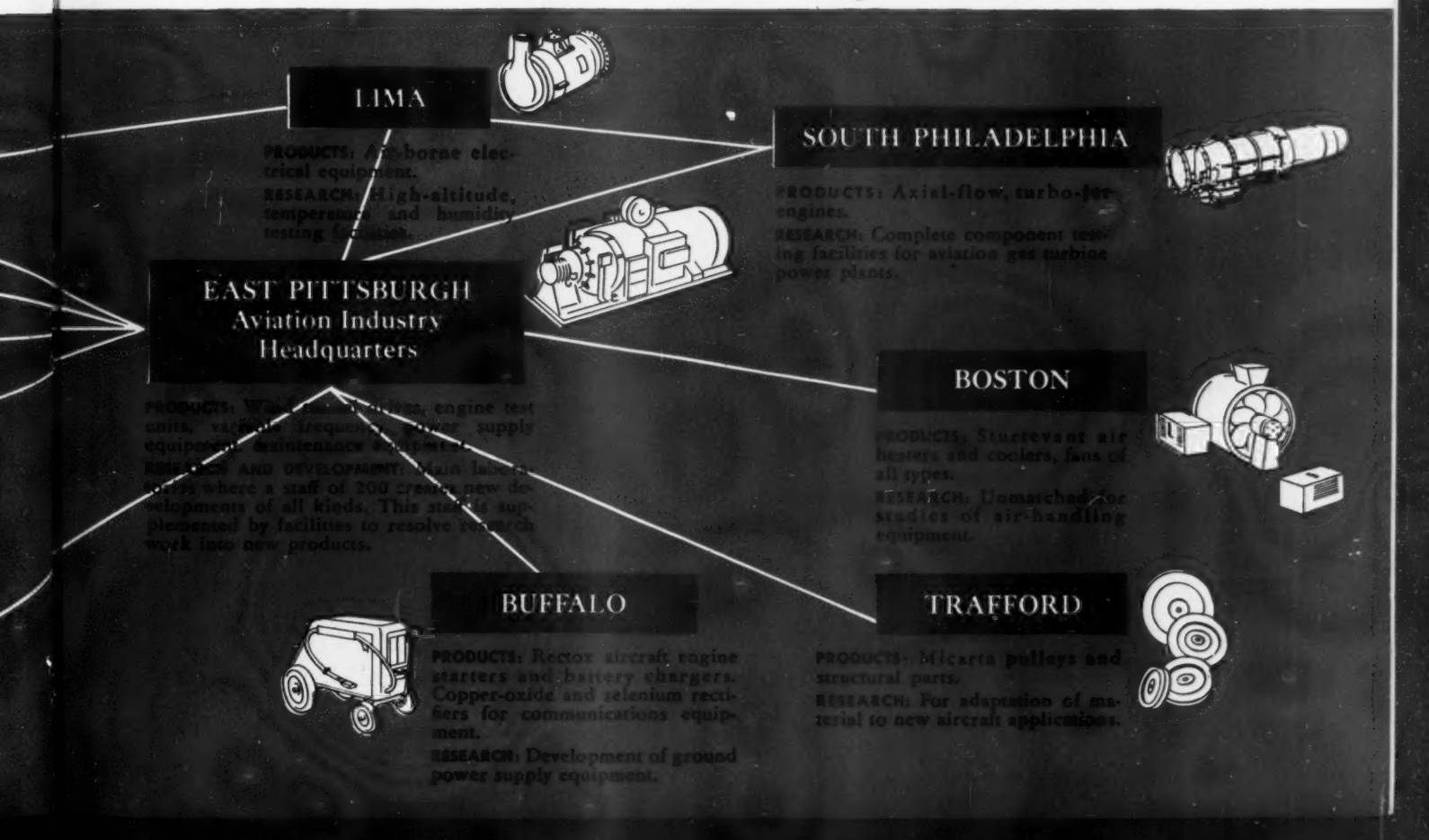
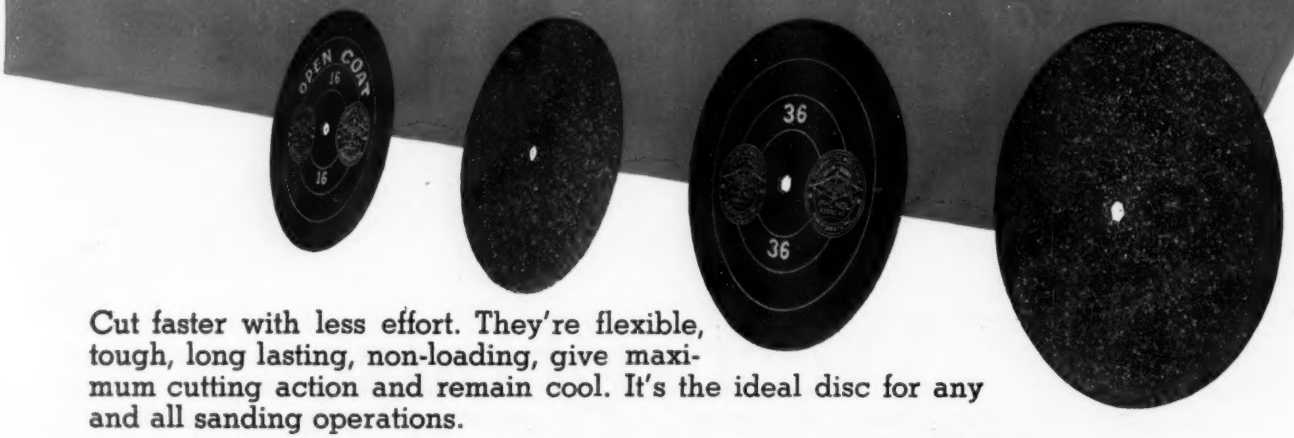
Leader in Aviation Equipment


LIMA
PRODUCTS: Air-borne electrical equipment.
RESEARCH: High-altitude, temperature and humidity testing facilities.
SOUTH PHILADELPHIA
PRODUCTS: Axial-flow, turbo-jet engines.
RESEARCH: Complete component testing facilities for aviation gas turbine power plants.
EAST PITTSBURGH
Aviation Industry
Headquarters
PRODUCTS: Wind tunnel drives, engine test units, variable frequency power supply equipment, maintenance equipment.
RESEARCH AND DEVELOPMENT: Main laboratories where a staff of 200 creates new developments of all kinds. This staff is supplemented by facilities to resolve research work into new products.
BOSTON
PRODUCTS: Stuctevant air heaters and coolers, fans of all types.
RESEARCH: Unmatched for studies of air-handling equipment.
BUFFALO
PRODUCTS: Rectox aircraft engine starters and battery chargers. Copper-oxide and selenium rectifiers for communications equipment.
RESEARCH: Development of ground power supply equipment.
TRAFFORD
PRODUCTS: Micarta pulleys and structural parts.
RESEARCH: For adaptation of material to new aircraft applications.

UNBEATABLE

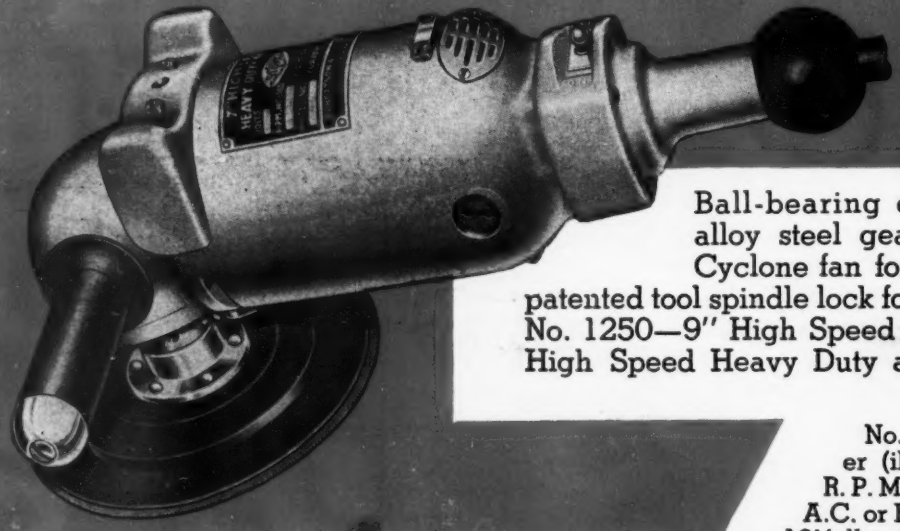
on the TOUGHEST SANDING JOBS — this SMOOTH Combination

SIOUX RESIN BOND Abrasive Discs



Cut faster with less effort. They're flexible, tough, long lasting, non-loading, give maximum cutting action and remain cool. It's the ideal disc for any and all sanding operations.

SIOUX High Speed Sanders



Ball-bearing construction, heat treated alloy steel gears, permanent lubrication. Cyclone fan for increased ventilation and patented tool spindle lock for changing discs. 3 Models: No. 1250—9" High Speed Heavy Duty; No. 1267—7" High Speed Heavy Duty and No. 1265—7" Special.

No. 1267 SIOUX Heavy Duty Sander (illustrated) No load speed 4250 R. P. M. Universal motor operates on A.C. or D.C. Overall length 15"—weight 13½ lbs. A very popular model.

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STANDARD THE WORLD OVER

ALBERTSON & CO., INC. SIOUX CITY, IOWA, U. S. A.

New Luscombe Four-Placer Designed for Room, Utility

Farm and business users are primary market goals for 165-hp. all-metal plane previewed at flying farmers national meeting.

By ALEXANDER McSURELY

A shiny new all-metal answer to the flying farmer's prayer—for a sturdy easy-to-operate multi-purpose farm plane—was announced last week by Luscombe Airplane Corp. at the National Flying Farmer Association meeting at Stillwater, Okla.

The high-wing, 165 hp. four-place Luscombe model 11 is moving rapidly toward production, we observed during a recent visit at the Dallas plant. A survey of the plant, made with Eugene Norris, vice-president, engineering, on a recent Saturday afternoon when the production force was not at work gave excellent opportunity to see jigs and fixtures being prepared for the four-place line and components already beginning to take shape.

Demonstrations of the new plane are scheduled in many parts of the country this fall, Leopold H. P. Klotz, president, has announced. Depending on certifications, material flow and other problems, the plane probably will come on the market about the first of the year or shortly before.

Price on the four-placer is not definitely fixed, but it will be competitive, the company has reported. Since the lowest priced four-placer now on the market is the Stinson Voyager 165—selling for $5,847 FAF—it is probable that the Luscombe may also start out to sell for around this figure, although the whole market for fixed gear four-placers may be dropped to around the $5,000 mark by additional expected entries from Cessna and Ercoupe.

► **Engines a Factor**—A recent price increase put into effect by Continental Motors is a serious new factor in all four-place plane competition and may make Aircooled Motors a more prominent figure in the personal plane engine field. It is known that some of the companies, including Luscombe, have studies on models of their four-placers using 165-hp. Franklin engines.

But the original Model 11 is powered with a Continental 165 and presumably the production planes will use this power plant exclusively, at least until an alternate certification is obtained. Since the Stinson uses a Franklin, the Voyager would have an advantage in lower cost here. However the Luscombe has been designed from the new landing gear up for simplified all-metal mass production and might well be less expensive to make than the welded steel-tube, fabric-covered Voyager.

Luscombe reports a cruising speed of approximately 130 mph., range of more than 500 mi., and states that the plane will carry four passangers and 100 lb. of baggage in addition to full gas load (40 gal.) or will carry 600 lb. of cargo plus pilot and a full load of fuel. Additional performance data reported by observers includes a top speed of 155 mph., landing speed of 58 mph., and 800 ft. per min. climb. Wingspan is 38 ft. and fuselage length 23 ft. All seats are removable to permit easy loading of large cargos through the wide doors to the 55-cu. ft. of cargo space in the cabin.

► **Has Good Visibility**—From the visibility standpoint the new Luscombe is well ahead of any highwing airplane we have seen. Large side windows give the usually-neglected back seat passengers a chance to look out, and a large back window and two windows in the top of the cabin makes overhead visibility less of a problem than in most high wingers. A big one-piece windshield gives good forward vision, and the engine is mounted at an angle that lets the pilot see over the nose so there is little or no need for S-turning in taxiing.

Except for the high wing and the conventional fixed gear the fuselage of the new Luscombe looks a bit like that of the Navion in general contours, a resemblance which is accented by the squared-off tail surfaces and the "hump" in the back where the roomy cabin tapers back to the tail. The Model 11 has more cabin room—both in width and length—than most of its contemporaries and it is quite easy to get in and out of the plane due to its wide doors. Door windows open with additional venti-

New Luscombe Model 11 has auto-like cabin.

lation through ducts and a vent over the back seat.

The newly developed Luscombe flexible landing gear, which also is being adapted to the two-place models in a lighter version, has already been subjected to extremely rugged drop tests and is expected to make both two and four-placers more adaptable to rough terrain and cow-pasture airstrips.

Wheel controls in the new airplane replace the stick controls which Luscombe has used heretofore. A throwover wheel or a single wheel control may be used in the production version.

▶ **Designed for Low Cost**—The Dallas manufacturer has been working consistently to lower production costs and thus drop ultimate price to consumers. Presumably this policy will continue with the Model 11 on the theory that the lower the price of the four-placer the bigger will be the volume of sales.

Going back to the Stinson Voyager—which is the best seller currently in the personal plane market—analysis shows that this is due not only to its relatively low cost but to the fact that it is one of the easiest and safest four-placers for the ordinary lightplane pilot to fly, and can utilize small fields which most other planes of its capacity cannot.

Luscombe is seeking to provide a plane with more payload, room and speed than the Stinson, to give a plane as easy and safe to fly and also give the important advantage of all-metal construction. If the Luscombe can do all this and sell for around the same price or even lower it will quickly become a serious contender in the four-place market.

There have been a few criticisms already—and there probably will be more—of the fact that the new four-placer's designers sacrificed a few of the sleek straight lines so dear to the heart of the draftsman in favor of more roominess and visibility. In our opinion it is a good sacrifice when measured against the importance of customer appeal in ultimate sales volume.

Granting that the bulging cabin adds some drag and cuts a few miles from the plane's cruising speed it is held that if the occupants are more comfortable because of the additional room they will be better satisfied with the plane.

Perhaps the Luscombe is the closest approach yet to a utility four-placer to be sold at a low cost. If so, it can win public acceptance no matter if it is as ugly as the old Ford Model T. (which it isn't by any means).

Flying Farmer Requirements

Luscombe Airplane Corp. hopes its new four-place plane will fit the specifications laid down by the National Flying Farmers Association (AVIATION NEWS, June 3, 1946) for farm planes. Forrest Watson, NFFA president, says the flying farmer wants:

- ▶ A plane built to withstand rugged use.
- ▶ Removable seats to provide extra cargo space for bulky objects.
- ▶ Starters.
- ▶ Larger wheels and balloon tires for easier landings and takeoffs on soft and rough ground.
- ▶ Doors that stay locked, windows with less rattle.
- ▶ Seat cushions with more cushion.
- ▶ Engine accessibility.
- ▶ Quickly removable windshields.
- ▶ More power for greater angle-of-climb on takeoff.

New Wisconsin Bill

The Wisconsin state legislature has passed a bill expanding the powers of the Milwaukee County Board for the zoning and development of airports. The far-reaching powers give the county the right to zone airport landing approaches and to close town roads in cases where county lands adjoin the road on both sides. The bill permits the county to rezone county land without the consent of town boards but preserves public access to private property affected by the closing of roads.

Visibility, roominess are features of new four-place Luscombe.

Solar Develops New Gas Turbine

A low horsepower gas turbine engine for auxiliary aircraft use or for commercial applications is under development at Solar Aircraft Co., San Diego, with completion scheduled about next January, the company's annual report discloses.

Solar believes the engine can be used to generate electricity in large planes, or as a prime source of power in motorboats or light planes. Company has also proposed design and construction of a larger jet engine for light Navy craft.

▶ **Manifold Production**—Manufacture of exhaust manifolds for reciprocating-powered planes still constitutes the bulk of Solar's aircraft production, but its jet engine components business is growing. Management is taking an active interest in turbine development, the report states.

Solar has several extensive military research projects in the jet field underway, in addition to development of its small engine. One is on thrust augmentation, another is on ceramic coating of metals as a method of raising permissible operating temperatures. A research contract on testing new heat-resistant alloys in exhaust manifolds might have implications in jet work.

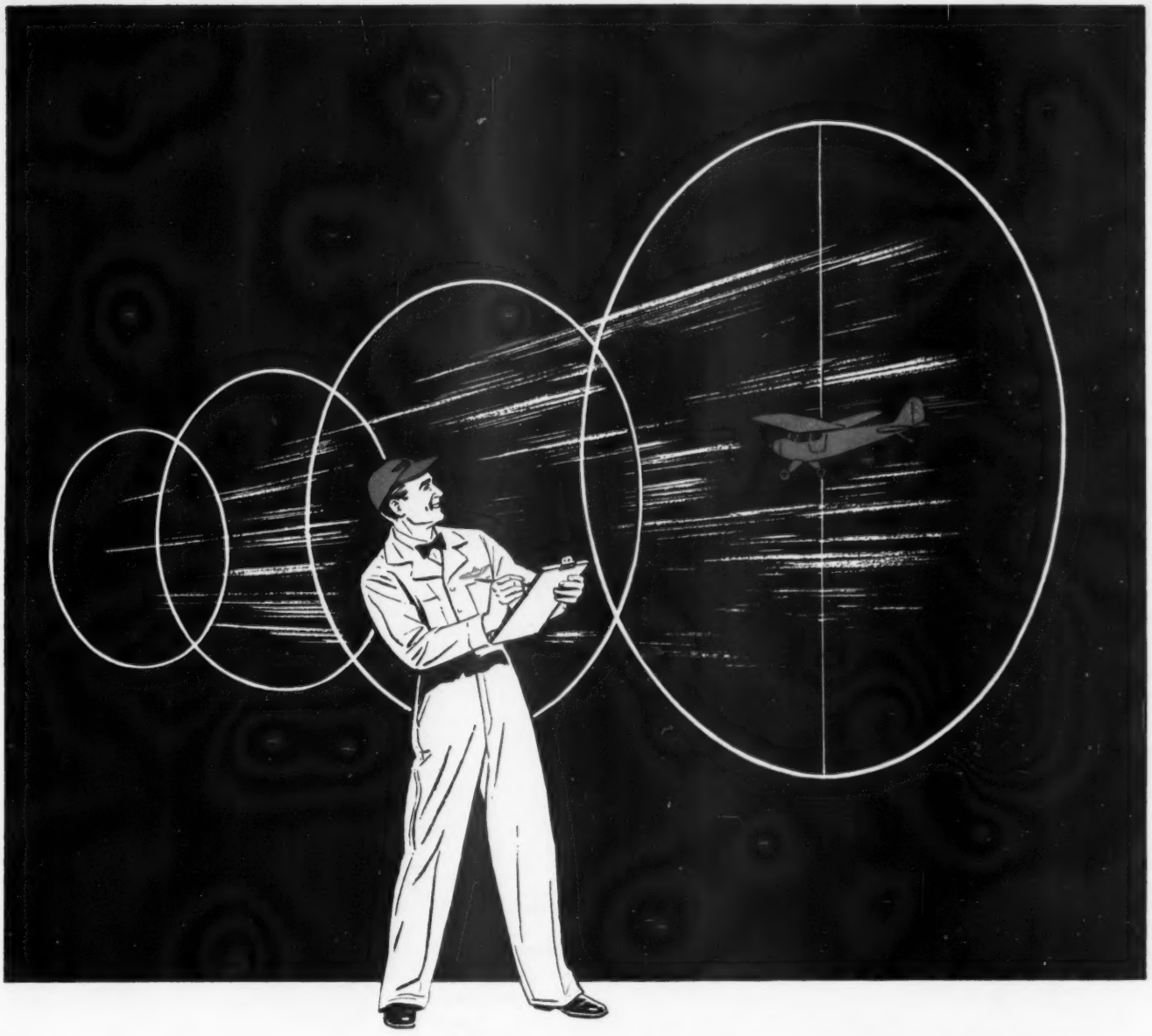
▶ **San Diego Research**—With most of the research work carried on in the San Diego plant, the largest part of the activity at the Des Moines factory is the manufacture of combustion chambers, transition sections, exhaust cones and other parts for jet engines. The San Diego plant, hub of exhaust manifold production, also turns out some jet engine parts.

At the end of the war, Solar deliberately sought to diversify its business by adding some commercial products. It studied many, began preliminary work on some before abandoning them, and continued others. Now it is still strong in the manufacture of steel caskets by a subsidiary, in turning out film processing and dairy equipment. Further diversification may be found unnecessary.

Because of the abandonment of certain projects and because the necessary organizational changes following the war were not fully completed during the period, Solar ended its fiscal year April 30 with a loss on operations of $2,265,898 on sales of $11,410,969. After carry-back and excess profits tax credits, net loss stood at $509,065.

New Beech Dealer

Carl Wootten, former Beech general sales manager, has formed Wootten Aviation Industries, Inc. in Orlando, Florida to serve as distributors for Beech and several other aircraft. Plans have been drawn for branch offices in Jacksonville, Miami, St. Petersburg and Bartow. Wootten plans an aggressive campaign to expand Florida's small airport program.



"Operation test tube"

It takes a sweet ship to pass all its exams and get into production these days.

And, for top performance—in *every* type of aircraft at any altitude—there's one more test worth making. That's a test hop on a tankful of Standard's aviation gasoline.

If you're like other folks who fly, you'll like its prompt response to the slightest signal from your throttle hand . . . on take-off, climb and cruise.

That's just one advantage you'll find in using the popular Skyway Service offered by Standard Oil Airport Dealers at hundreds of convenient fields throughout the Middle West.

They're always ready with a cordial welcome—with skillful service—with matchless aviation fuels and lubricants and other flight necessities.

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Use New Seaplane In Float Base Survey

Development of a special Luscombe Model 8E "X"-tagged seaplane has been revealed by Theodore M. Wayave, chief of the CAA's Seaplane Facilities Section, who told New York Region members of the Aviation Writers Assn. that he had been flying this "first lightplane designed solely for water operation" on a survey trip through the south and east.

Mid-section of the plane is specially constructed and stressed to take the Edo float fittings, the Continental engine has been metallized and features waterproofing, and the craft's wing is of new design. Also fitted is a variable pitch propeller. And to simplify crane-handing of plane, there are three metal "eyes" atop the fuselage.

Mr. Wayave is using his Luscombe to contact local interests throughout the country regarding suitable seaplane base sites. CAA goal, he said, was 250 major seaplane bases "so located that at least one such facility would be available to cross-country seaplane pilots approximately every 125 mi." Particular aim is to establish adequate service and anchorage facilities, lack of which he called "the biggest stumbling block to the growth of seaplane flying."

Combined expenditure for the 250 bases is envisioned at about $2,500,000, or an average of $10,000 per base. And since many water facilities now in operation were set up at only a fraction of that figure, promise is held of well-rounded accommodations featuring major ramp, dock, service, fueling, and parking facilities.

Included are plans to establish bases on leased federal or state reservoir land, tied in with parks, picnic and camping grounds, and resort hotel facilities to be erected in those areas by private interests with full government encouragement. Wayave indicated that both government and state agencies were prepared to lease such acreage at extremely low rates.

In localities not situated on suitable bodies seaplane base data formerly incorporated in visualized that these might be economically made simply by bulldozing a 3-ft. deep channel, then installing pumps and control level floats to keep the water level constant. Tulsa, Okla., has such a lagoon under discussion. It would be a 400-ft. wide by 4,500 ft. long water strip in the lowlands but 10 min. drive from the heart of the city. Removed dirt could be employed in making adjacent landplane strips.

In conclusion, Wayave reported that the seaplane base bata formerly incorporated in the *Airman's Guide* has now been published separately in a new booklet, *Seaplane Base Directory*. First issue is being distributed.

SUPER CRUISERS IN SPAIN

Display of two Piper Super Cruisers and a J-3 Trainer, at a recent fair at Madrid, Spain, is one of several foreign exhibits of American light planes which have been reported recently as manufacturers are placing increasing emphasis on export sales. Piper recently has set up show rooms in Shanghai, China, and Lisbon, Spain. Corgaso, Piper distributor for Spain, Spanish Morocco and Tangiers, has headquarters in Madrid.

LOST AND FOUND DEPT.:

Insignia of new volunteer air safety organization, Idaho Search and Rescue, marks group of airmen, flying service operators, newspaper and radio men joined to conduct hunts for missing planes and provide aid to pilots in distress. Believed first of its kind, organization will be financed by pilots through registration fees collected by state. State aeronautics department will reimburse money expended for fuel and oil in air search operations. Organization's plans call for complete blanketing by aircraft of any area in or near Idaho where plane is reported missing. Aiding in its rescue work when necessary will be forest service, with its "smoke jumpers"; CAA and 190th Fighter Squadron of Idaho National Guard.

New Bell Dealer

A new concern, headed by President Leslie L. Irvin of Irving Air Chute Co. Inc., Buffalo, has been formed in England as a dealership in the British Isles for Bell Aircraft Corp. helicopters. It is Irvin-Bell Helicopter Sales Ltd. of Letchworth, Eng. Headquarters of Irvin-Bell will be at Scotitsh Aviation Ltd. in Ayrshire, Scotland, a company which has a substantial financial interest in the new organization. Maintenance, sales and service facilities and a training school for pilots and mechanics will be established at Ayrshire.

Ohio Operator Reorganizes As Richland Aviation Inc.

Richland Aviation, Inc. of Mansfield, Ohio, is the new name of Harrington Air Service. The new aircraft sales and charter service company resulted from a regorganization of the former company following involuntary bankruptcy proceedings in Cleveland Federal court.

The new 12-member board of directors of Richland include: Robert B. and Roger A. Black, officers and sons of the founder of Ohio Brass Co.; C. H. Kenkel, official of Mansfield Tire and Rubber Co.; Ray Eiche, manager of Richland's Cleveland sales branch, and A. E. Fletcher, credit manager of Standard Oil Co. of Ohio.

The reorganization was effected through liquidation of about $340,000 in creditor's claims by issuing one share of common stock for each $100 in claims.

Larson Heads Sales For TEMCO's Swift

Building up its marketing organization for handling the Swift, Texas Engineering & Manufacturing Co., Dallas, has appointed Leonard Larson sales manager of the personal airplanes division.

Although most recently with Adel Precision Products Corp., Larson is a former employee of North American Aviation, Inc., as are most other key TEMCO personnel. He has been a pilot since 1928 and has an aeronautical engineering degree from Louisiana State University.

In another sales personnel action, Safe Flight Instrument Corp., White Plains, N. Y., named Arthur S. Brown sales manager. Formerly sales manager of Scott Aviation Corp., Brown will now direct sales of Safe Flight Indicators.

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KC, Dallas Compile Local Air Studies

A mounting community recognition of the size and value of its aviation activities is evidenced in studies just completed by the Dallas, and Kansas City Chambers of Commerce. The Dallas study reveals that aviation in the community employes 4,850 persons with an annual payroll of more than $15,000,000. The Kansas City payroll of $25,000,000 to 8,000 employees is made up largely of TWA Headquarters, which comprises about 70 percent of the total amount.

Dallas estimates that its aviation enterprises provide a gross business of more than $50,000,000 to the residents of the city, of which about $7,500,000 is contributed by Luscombe Airplane Corp. Other large aviation income producers are 12 privately-operated airports employing 650, two aircraft conversion firms employing 1,250, 12 dealers and distributors and 15 flying schools with a total enrollment of 800.

Kansas City's aviation revenue, in addition to that provided by TWA, includes over $3,500,000 from the Army and Navy, nearly $2,000,000 from local CAA offices, slightly more than $1,000,000 from aircraft suppliers, more than $665,000 from private operators and $163,732 from air cargo companies. During 1946 a total of 17 Kansas City fixed base operators grossed $2,829,213, three grossing more than $500,000 each.

Sales Trip in Navion Brings Enthusiastic Report

A four-place North American Navion used in a 24-day test of its utility for sales visits and sales promotion traveled 6,447 air miles in 55 hr. 37 min. at a total cost of $341.93 including fuel, oil, storage, maintenance, landing fees and insurance, but excluding depreciation. Cost per mile was 5.3 cents and cost per hr. of operation was $6.147.

The plane was loaned by North American to the Butler Manufacturing Co., Kansas City, Mo. for the experimental use. H. C. MacBrair, Jr., pilot, estimates that to cover the same territory by automobile would require driving 6,989 miles and consuming 174 hr. 44 min. at a 40 mph. average. It would be necessary for the salesman to drive 8 hr. 43 min. five days a week during the four week period to cover the ground, leaving virtually no time for sales contacts.

Many of the Butler sales calls were made on airports visited in relation to the hangars and airport buildings manufactured by Butler. MacBrair points out that the treatment the salesman receives from airport managers and operators when traveling in a personal aircraft is far superior to that received when he travels by auto and that the advertising value to the company of using a plane for sales trips is an important consideration.

Urge Market Study By Dealers, Distributors

Greater use of available statistical information on markets in aviation in analyzing the portion of such markets available to individual distributors and dealers was urged at the recent Aviation Distributors and Manufacturers Association mid-summer meeting at Mackinac Island.

Thomas G. Tynan, Philadelphia, ADMA Merchandising Chairman, cited a hypothetical case in which a distributor in an area where 10,000 airplanes are in use, could analyze his potential sales of an equipment item by applying the manufacturer's replacement rate on the item to the number of planes and then determine further the percentage of the entire potential market which he expected to obtain for the sales effort which he was prepared to put forth.

The merchandising chairman also discussed advantages of local trade clinics held by distributors to promote sales of specific products and to bring about more advantageous mutual relations between distributor and dealer. Cooperation of manufacturers in supplying display models, promotional material and company representatives as speakers is an important factor in the success of these meetings which are also advantageous to the manufacturer, Tynan pointed out. They enable the manufacturer to reach at a single meeting a large group of dealers of his product, giving them simultaneously new information about the product and new sales approaches.

Typical of the new aviation technical information clinics was one held recently by Berner-Pease, Miami, Fla. distributor, with 160 persons attending the two-night meeting. Talks by C. N. Dunn, Glidden Co. sales manager, Harold Dellett, Aircraft Tools Inc. sales manager, and Wayne Carlson, Miami district representative of Goodyear Tire & Rubber Co., and instructional motion pictures and demonstrations of various tools, equipment and parts were on the program. In addition to operators and dealers, a number of representatives of major airlines attended the Miami clinic.

Only 443 Airports Score High

Reports of a recent survey by Aircraft Owners & Pilots Association indicate that only 443 out of more than 5,000 airports in the country were approved as meeting standards set by the association for safety, service and courtesy.

The survey, which is continuing, is being made by individual AOPA members who report their findings to Washington on postcard forms. Main objective of the study is to single out the good airports for recommendation to the 32,000 AOPA members in preference to sub-standard fields in the same localities. Certificates will be issued soon to the 443 high score airports with AOPA's endorsement as being "a credit to aviation."

BRIEFING FOR DEALERS AND DISTRIBUTORS

AIR SHOW RESTRICTIONS–A new Civil Air Regulation part 60 is reported in the mill–and soon to be circulated for industry comment–which will restore to CAA at least part of its rights to regulate air shows. Inquiry discloses that CAA lost most of its rights to supervise air shows with the revision of part 60 which was adopted in August, 1945. Previously the Administrator had been authorized to supervise shows and grant waivers of rules for close-to-the-ground acrobatics when the show met specified conditions as to equipment, flyers' competency, etc. Now about all that CAA can do is to enforce regulations about stunting over crowds, etc. But the flyers can do virtually anythnig they please as long as it doesn't endanger others.

NEW LIGHTPLANE VHF UNIT–National Acronautical Corp., Wings Field, Ambler, Pa., is preparing to market a lightweight VHF unit which can be incorporated in standard lightplane radio transmitters. It is one of the first of a series of electronic and radio products which NARCO, heretofore an engineering and sales organization, will market. Key figures in NARCO are James Riddle, president, and Rudy Garfield and A. R. Applegarth, vice presidents. The company is best known for its development work on the Hallicrafters personal plane radios and will continue to serve as national aviation representatives for Hallicrafters Co. In addition to its development, manufacturing and service division operations at Wings Field.

NATIONAL GUARD LIGHTPLANES–Vacancies for 850 lightplane pilots in National Guard artillery and liaison units have been announced. Pilots will be commissioned and authorized for 100 hr. flying time a year as training. Former AAF pilots who can pass class I or class II physical examinations are eligible if they attend a 60-day orientation course on ground force and liaison and observtaion work at Ft. Sills, Okla. First class starts Aug. 15, second class Oct. 17, and other classes are planned to follow as needed. Non-flyers who meet other requirements may be chosen for pilot training in an 8½ mo. course at Ft. Sill and San Marcos, Tex. In addition to 100 Piper L-4s and Stinson L-5s which are now being removed from surplus for reconditioning for use in the program, 47 North American L-17s (Navions) and 376 Aeronca L-16s (converted Champion tandem trainers) will be assigned in the program.

CROSSWIND GEAR DEMONSTRATIONS–Demonstration by CAA of the Piper J-3 Cub trainer equipped with Goodyear castering wheels for crosswind landings was an effective factor in the successful local Milwaukee campaign for continued development of the Maitland downtown airstrip. The plane is now traveling around the country in demonstrations of its ability to ignore crosswinds, stopping among other places, at the National Flying Farmers Association meet at Stillwater, Okla., last week. Meanwhile the Firestone tricycle crosswind gear developed on an Ercoupe is scheduled for an early Washington demonstration to CAA. Harry Copland, veteran pilot who first soloed in 1911 and has been named personal flying assistant to the Third Region CAA Administrator at Atlanta, plans to demonstrate the Goodyear plane shortly in Atlanta.

COOPERATION NEEDED–Success of the proposed Los Angeles-Washington private flyers' airway will probably be governed largely by the cooperation of aviation people along the 40-mi.-wide skyway. If the aviation interests in each area see to it that their towns are equipped with standard markers,–make an effort to dress up their airports and polish up their service to the touring flyers who use the route it could well be one of the biggest aids to promotion of private flying which have yet been found. The local airports and operators will benefit from the new business which should steadily increase if the proper service and facilities are provided and as more flyers learn of the advantages of following this route. Originally proposed by the Los Angeles Chamber of Commerce, the skyway now has been approved by both CAA and the Personal Aircraft Council and both organizations expect to cooperate in the survey flight along the route planned soon.

DEALERS GET LAST NAVIONS–North American Aviation, Inc., has completed sale of its inventory of four-place Navions to its dealer organization and the last new Navions still at the factory at Inglewood will be delivered this month. The Navions in dealers' hands will be the last to be obtained until Ryan Aeronautical Corp., San Diego, which purchased the plane, begins production probably sometime in October. North American will continue to operate its Coastair sales and service division for Navions in southern California and Arizona for the benefit of Navion owners in the area until Ryan sets up sales and service facilities for the territory. Of the 339 Navions which remained at Inglewood when North American stopped production, 256 went to dealers and the remaining 83 were purchased by the Army Ground Forces and National Guard with military designation L-17 (See national guard lightplanes above).

–ALEXANDER McSURELY

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Mishaps Involving Larger Planes Boost Passenger Fatality Rate

Four accidents occur during first half of both 1946 and 1947 on domestic airlines; fair safety record still possible this year.

Passenger fatality rate on the nation's certificated domestic airlines probably will be higher during 1947 than in any year since complete safety statistics became available in 1939, but there is serious doubt whether the crashes of the past seven months warranted the publicity, criticism and investigations that have resulted.

By most other nations' standards, the U. S. carriers' record of 5.3 passenger deaths per 100,000,000 passenger miles during the first half of 1947 and 4.4 during the first seven months would be excellent. To some degree, American operators apparently are the victims of their own safety achievements during the past 10 years.

► **Previous Rate**—In 1946, the domestic airlines had 1.24 passenger fatalities per 100,000,000 passenger miles, best mark since 1939's record of 1.2. Rate during the six years from 1940 through 1945 ranged from 1.32 to 3.66. Should the carriers go through the remainder of 1947 without a fatality, the rate this year (assuming a 20 percent increase in traffic over 1946) could be reduced to 2.1.

Great Britain, one of the few nations which also publishes complete air safety statistics, has shown consistently a higher fatality rate per 100,000,000 passenger miles than has the U. S. Including overseas operations, British carriers reported a fatality rate of 11.4 during the first nine months of 1946 and an average of 10.4 during the five years from 1941-1945. (Mark for U. S. international carriers in 1946 was 3.52.)

► **Comparison With 1946**—Significantly, exactly the same number of fatal accidents—four—occurred on the domestic scheduled airlines during the first half of both 1946 and 1947. Fifty-six passengers and 12 crew members were killed during the first six months of 1946, when all four accidents involved DC-3s. One hundred and fifty-two passengers and 12 crew members were killed during the first half of this year, when three of the four crashes involved DC-4s.

In U. S. international operations, two fatal accidents took place during the first half of 1947—the Pan American Airways crash at Meydana, Syria, June 19, when seven crewmen and seven passengers were killed; and the TWA mishap March 11, when a crewman was sucked through a Constellation astrodome over the Atlantic.

► **Uncertificated Lines**—Accidents involving uncertificated carriers using transport-type equipment accounted for nine fatalities during the first half of 1947. Four were killed when a Nationwide Air Transport Service passenger DC-3 crashed at Carmel, N. J., Jan. 5; two died in a Slick Airways C-46 cargoplane accident at Denver, Feb. 14; one was killed in an International Air Freight cargoplane accident at Harrington, Del., Feb. 5; and two in a U. S. Airlines C-47 cargoplane crash at Charleston, S. C., March 14.

While airplane accidents captured the headlines, a comparison with the railroads' safety record this year is noteworthy. During the first five months of 1947, 1,706 persons were killed and 20,325 injured in railroad train mishaps.

Meanwhile, the President's special board of inquiry on air safety this month issued new recommendations to prevent aircraft collisions with terrain. The action is a direct outgrowth of the airlines' most recent accident—the Capital Airlines (PCA) crash near Leesburg, Va., June 13.

► **Emergency Step**—James M. Landis, CAB chairman and chairman of the special board, said emergency steps are necessary to prevent pilots from "feeling their way down" from low visibility instrument conditions to reported or hoped for visual conditions.

The Board urged that minimum enroute and initial approach instrument altitudes be standardized over each route flown by airline planes engaged in passenger operations. Some degree of standardization has already been achieved in western U. S., but the special board feels that nationwide standardization is vital to safety generally.

► **Recommendations Listed**—It was recommended that pilots not be permitted, except in emergencies, to fly below prescribed standard minimums in instrument weather conditions. Further, no clearances for instrument flight under these minimums would be issued by Air Traffic Control.

The President's board also urged that minimum enroute altitude for aircraft engaged in passenger operations for hire be raised from the present 500 ft. to 1,000 ft. above the terrain except for such special cases under day visual flight rule conditions as may be specifically authorized by CAA.

It was suggested that where pilots of passenger-carrying aircraft, flying at or above the prescribed minimum instrument altitudes, encounter visibility conditions suitable for visual flight they may descend below such altitudes and continue their flight at altitudes down to 1,000 ft. above the terrain after securing approval from Air Traffic Control for such descent. Thus, if pilots have three miles visibility and 500 ft. vertical separation from the clouds, they may then proceed in accordance with visual flight rules at altitudes down to 1,000 ft. above the terrain after notifying Air Traffic Control of this fact and that they are canceling their instrument flight plan.

TEST FLYING STRATOCRUISER

New photo of first Boeing Stratocruiser on test flight over Puget Sound, near Seattle factory. In initial stage of testing plane made seven flights in as many days.

Nonscheduled Lines Renew Protests

New group formed to protect irregular carriers' interests against CAB regulation.

What may be one of the last attempts at organized protest against the increasingly severe CAB restrictions on nonscheduled airlines took form during the past two weeks as several of the irregular operators formed the Independent Air Carrier Conference of America and sought the backing of Congress and veterans' organizations.

Latest revisions of Section 292.1 of CAB's Economic Regulations (the nonscheduled exemption) have brought the irregular operators, especially those using transport-type equipment, to a critical point, IACCA has declared. In a letter to the Veterans of Foreign Wars, the group stated that the new regulations (made effective June 10) will prevent many operators from remaining in business and may mean not only the loss of their planes but their homes as well because of indebtedness.

▶ **Founders Named**—IACCA was founded by three small independents, S. S. W., Concord, Cal.; Seattle Air Charter, and Aviation Corp. of Seattle. Through its general counsel, John J. Klak, Albee Building, Washington, D. C., it has sent out letters to over 1,350 uncertificated operators pointing out effects of CAB's new regulations.

The letters state that it is the observation of CAB's Economic Bureau that Section 292.1 was promulgated "because the Civil Aeronautics Act, from its inception, made the scheduled airlines virtually a monopoly, and any interference by the irregular operator would have to be noncompetitive." IACCA believes contract operations will be virtually impossible because of the latest revision of the nonscheduled exemption and declares that any uncertificated line with more than a very few contracts is likely to be classified as a common carrier.

▶ **Tariff Problem**—A new provision requiring the filing of tariffs by the larger independents also has become a difficult problem. IACCA said CAB's Tariffs and Service Division will require immediate submission of tariffs for the myriad of airports between which an irregular air carrier using transport-type equipment is likely to operate. "A general per mile or per pound rate is indicated as not meeting the requirements for submitting a tariff," the warning letters to the independents declared.

IACCA has suggested that CAB call a meeting of independent air carriers and interested veterans' organizations for a further discussion of the problems involved. The group also wants CAB to suspend restrictive parts of 292.1 at least until Jan. 1, 1948.

▶ **Applications Received**—Meanwhile, CAB by Aug. 1 had received 724 applications from irregular air carriers for letters of registration, and 650 letters had been issued. Unless an irregular (nonscheduled) air carrier has filed for a letter by Aug. 10, it may not continue to operate after that date.

About 665 of the applications have come from carriers using no planes of more than 10,000 lb. gross takeoff weight, but around 60 were from operators utilizing transport-type equipment (Lockheed Electras or larger). The letters of registration do not imply that CAB has approved the service offered by the holder, and the letters can be revoked immediately for violations of the nonscheduled exemption.

Operators using transport-type equipment who have received letters of registration include:

American Air Transport and Flight School, Miami Springs, Fla., 2 DC-3s, Nationwide Air Transport Service, Miami Springs, 5 DC-3s; Transair, Inc., New York, 3 DC-3s, 1 DC-4; Seaboard & Western Airlines, New York, 2 DC-4s; Maine Air Transport Co., Rockland, Me., 3 DC-3s; Consumers Airlines, Champaign, Ill., 3 DC-3s; Trans Caribbean Air Cargo Lines, New York, 3 DC-3s, 4 DC-4s; Southern Air Transport, Miami, 1 DC-3.

Magnolia Airlines, New Orleans, 1 Lockheed Lodestar; A. Dieterle, Chula Vista, Cal., 1 Douglas B-18; Miami Airline, Miami, 6 DC-3s; **International Air Freight,** West Palm Beach, Fla., 2 DC-3s; **Strato-Freight, Inc.,** Albany, N. Y., 2 DC-3s; **Eastern Aviation, Inc.,** Beverly, Mass., 1 Lockheed Lodestar; **Nats Air Transportation Service,** Oakland, Cal., 2 DC-3s; **Atlantic Gulf & Midland Corp.,** Little Ferry, N. J., 1 DC-3.

Gulf & Western Airlines, Houston, Tex., 1 DC-3; Matson Navigation Co., San Francisco, 2 DC-4s; Oxnard Sky Freight, Oxnard, Cal., 2 DC-3s; Aero-Van Express Corp. (Viking), Burbank, Cal., 8 DC-3s; Trans-Pacific Airlines, Honolulu, 4 DC-3s Mercury Airlines, Columbus, O., 5 DC-3s; Barnes Aircraft, Lumberton, N. C., 1 Lockheed Lodestar; Brinckerhoff Flying Service, College Park, Md., 1 DC-3; Skytrain Airways, New Orleans, 2 DC-3s; Trans-Luxury Airlines, New York, 3 DC-3s; Resort Airlines, Southern Pines, N. C., 4 DC-3s; Waterman Airlines, Mobile, Ala., 4 DC-35; 2 DC-4s; Ocean Air Tradeways, Ronkonkoma, L. I., N. Y., 1 DC-4.

Quaker City Airways—Philadelphia, 1 DC-3; Chesapeake Airways, Salisbury, Md., 2 DC-3s; American International Airways, New York, 5 Boeing 314As; Pacific National Airline, San Francisco, 1 DC-3; M. D. Bryant, San Angelo, Tex., 1 DC-3; Kesterson, Inc., Knoxville, Tenn., 1 DC 3; Reg Robbins, Houston, Tex., 1 DC-3; Arnold Air Service, Anchorage, Alaska, 2 DC-3s; Moon Flying Service, South Bend, Ind., 1 Lockheed Electra; American Air Export & Import Co., Miami Springs, 4 DC-3s; Columbia Air Cargo, Portland, Ore., 2 DC-3s.

Sabihon Aviation, Wahiawa, Oahu, Hawaii, 1 DC-3; Mercury Airlines, Fort Worth, Tex., 4 DC-3s; Bruning Aviation, Springfield, Mass., 3 DC-3s; Twentieth Century Air Lines, Charlotte, N. C., 3 DC-3s; General Air Cargo, Portland, Ore., 2 DC-3s; Western Skyways Service, Troutdale, Ore., 1 Lockheed Lodestar;; Central Flying Service, St. Louis, 1 Lodestar; Trans-Mississippi Airways, Omaha, 2 DC-3s; Continental Charters, Miami, Fal., 2 DC-3s.

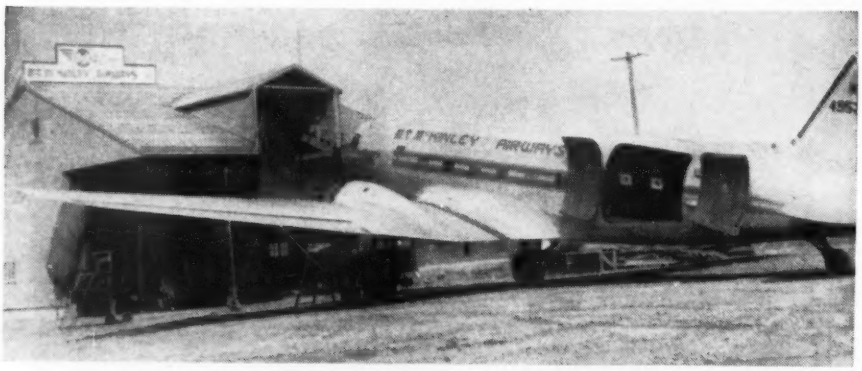
Carriers which had applied for but not yet received letters of registration under 292.1 included:

Caribe Airways, Puerto Rico, 4 DC-3s, 1 DC-4; Eagle Air Freight, Burbank, Cal., 3 DC-3s; Missouri Airways, St. Louis, 1 DC-3; Capitol Airways, Nashville, Tenn., 1 Lockheed Lodestar; Trans-Alaskan Airlines, Anchorage, 1 DC-3; Golden North Airways, Fairbanks, Alaska, 2 DC-3s; Southern Airways Co., Atlanta, Ga.; 1 Lodestar, 1 DC-3; Standard Air Cargo, Seattle, 1 DC-3; Rainier Air Freight Lines, Seattle, 3 DC-3s; Appalachian Flying Service, Johnson City, Tenn., 1 Lodestar; Airline Transport Carriers, Burbank, Cal., 3 DC-3s; Gulf Airways, New Orleans, 1 DC-3; U. S. Flying Services Division of U. S. Airlines, St. Petersburg, Fla., 1 Lodestar, 2 DC-3s.

State Airlines Takes CAB Case to Court

State Airlines, Charlotte, N. C., has taken CAB's decision in the Southeastern Area Case (AVIATION NEWS, April 14) to the U. S. Court of Appeals for the District of Columbia. The carrier claims the Board denied its application and at the same time awarded some of the routes State Airlines was seeking to Piedmont Aviation, Inc., which had never requested these links.

State asserted that CABS's decision denied it the due notice and fair hearing required by law since never in the course of the Southeastern case was the company aware that Piedmont was a contender for a number of the links it received. Petitions for reconsideration of the Southeastern case are still pending before CAB.



REFUGE FOR COLD NOSES: After experiencing record 40-degree-below-zero temperature last winter, Mt. McKinley Airways, uncertificated operator at Merrill Field, Anchorage, Alaska, has completed a nose hangar in anticipation of another deep freeze next January and February. One of the C-47s operated by MKA between Alaska and Washington state is shown outside the new structure. Traffic at municipally-owned Merrill field has nearly doubled over last year, with 12,530 flights (11,816 local, 205 itinerant and 509 air carrier) recorded during April, compared with 6,624 in April, 1946.

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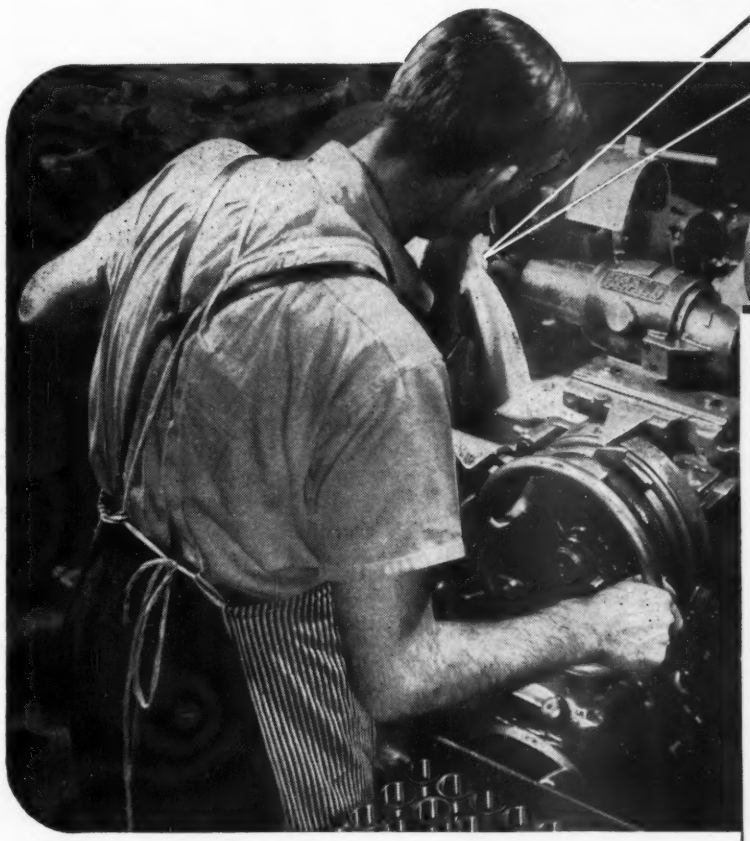

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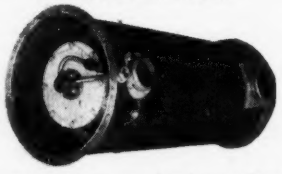

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Freight Tariffs Approved by Cab

The consolidated freight rate tariff filed last month by 19 certificated airlines has gone into effect despite the strong opposition of the Air Freight Forwarder Association (AVIATION WEEK, Aug. 4).

Previously prevailing rates, generally based on 26.5 cents a ton mile, have now fallen 25 percent to 20 cents a ton mile, with a spread ranging from 33 cents a ton mile for small packages moving short distances to 14 cents for planeloads of 16,000 lb. Two other tariffs filed by the certificated airlines also have become effective—one embracing rules and regulations for handling freight on a nationwide basis, and the other listing pickup and delivery service at more than 2,150 points in 45 states.

▶ **Blow to Forwarders**—CAB's failure to suspend the certificated airlines' rate tariff as requested by the forwarders is a hard blow to the indirect carriers. Charges contained in the new tariff are set up in such a way as to prevent the forwarders from profitably using the services of the certificated lines by consolidating small shipments into larger lots to take advantage of rate differentials.

The certificated airlines' new freight rate and pickup and delivery tariffs, together with the development of Air Cargo, Inc., as an efficient ground service organization, are long-range threats to Railway Express Agency's air express operations. New low cargo rates of both the certificated and uncertificated airlines (especially the latter) are also a definite challenge to REA's railway express business, since rail express charges have been rising steadily and are now very close to some airfreight charges.

▶ **REA Move**—With the future of its air express service over the regular airlines in doubt, REA this month asked CAB authority to ship all types of property via uncertificated cargo operators which now are obtaining temporary common carrier privileges under section 292.5 of CAB's Economic Regulations. REA has been operating as an indirect carrier in sending air express over the certificated lines under a special exemption issued by CAB in 1941.

Meanwhile, U. S. Airlines, St. Petersburg, Fla., has become the second uncertificated cargo carrier to receive a letter of registration from CAB authorizing common carrier operations until its route applications have been decided. U. S. will be permitted to serve 31 domestic points. Globe Freight Airline, Hartford, Conn., received the first letter of registration under 292.5 last month. Twentieth Century Air Lines, Charlotte, N. C., last week became the 17th carrier to file for a letter of registration under 292.5.

CAB ACTION

The Civil Aeronautics Board:

- Denied petitions of Eastern Air Lines and National Airlines for reconsideration of Board's decision of May 5 which denied the two carriers' applications for routes to the Canal Zone. (Docket 525 et al.)
- Denied petitions of Eastern and Colonial Airlines for reconsideration of May 5 decision approving Pan American Airways-Panagra agreement providing for operation of Panagra Planes and crews over PAA's routes between the Canal Zone and U. S. ((Docket 2423.)
- Permitted Eastern Air Lines to inaugurate nonstop service between Newark, N. J., and New Orleans.
- Permitted Royal Dutch Air Lines (KLM) to serve New York City through Newark Airport.
- Relieved Empire Air Lines of the condition in its AM 78 feeder certificate which requires carrier to serve each point on each trip to the extent that Empire will be permitted to operate one roundtrip daily between Spokane, Wash., and Boise, Idaho, serving only Coeur D'Alene and Lewiston-Clarkston, Idaho, and Pullman, Wash.-Moscow, Idaho, as intermediate points. (Dockets 2788 and 2996.)

NWA Mail Pay Set

Northwest Airlines' temporary mail pay for services over its North Pacific route has been set by CAB. For operations from Seattle to Anchorage, Alaska, (inaugurated last September) and from Minneapolis to Anchorage (inaugurated Jan. 1) NWA will receive 59 cents a plane mile on and after Jan. 1, 1947.

For operations performed on the remainder of its Pacific link, westward of Anchorage to Tokyo, Shanghai, Manila and other points, the carrier will be paid $1.75 a plane mile on and after July 15, 1947, when service began. By comparison, Pan American Airways is receiving $1.20 a plane mile over its Central Pacific route to the Orient via Hawaii. (AVIATION NEWS, May 12).

Canadian Report

Canada's three scheduled air carriers—Trans-Canada Air Lines, Maritime Central Airways and Canadian Pacific Airlines—experienced much the same pattern of operating results as U. S. companies during the first quarter of 1947.

Official civil aviation statistics show that the Dominion's scheduled lines, like U. S. carriers, flew more revenue plane miles during the first quarter of 1947 than in the same 1946 period, although load factors were down as available seat capacity soared and deficits were higher as expenses rose faster than revenues. Revenue passenger mileage for the three Canadian lines climbed from 35,143,274 in first quarter 1946 to 38,285,044 in first quarter 1947, but aggregate net operating deficit increased from $99,237 during the first quarter last year to $1,442,207 this year, and combined load factors skidded from around 77

PCA Loan Extended

Capital Airlines (PCA) has announced extension of its four million dollar bank loan to Nov. 1, 1947. The loan was made on Aug. 1, 1946, and became due May 1, 1947. At that time it was extended to Aug. 1 and now has been extended another three months.

CONESTOGAS MAKE COMEBACK

Flying Tiger Line, which owns only Budd stainless steel Conestoga transports still in this country, is reviving their use as cargo planes. Until recently, Tigers would have sold ships for a comparatively low price because of their high operating cost. But now carrier is keeping one Conestoga reasonably busy on a dollar-a-mile charter basis. A ramp entrance makes the ship ideal for flying race horses and, as shown above, automobiles. Line contracted to fly one and only Tucker "Torpedo" automobile from Chicago to Los Angeles, back to East Coast, and again to Los Angeles during a month of formal public presentations of new car. Fourteen Conestogas (all of this type plant extant) were purchased by Tigers from war surplus in 1945.

Laramie Accident Blamed on Pilot

The accident in which a NATS Air Transportation Service DC-3 crashed near Laramie, Wyo., airport last Oct. 17 probably was caused by the pilot's decision to maneuver his plane at a dangerously low altitude under extremely adverse weather conditions while attempting to land, a CAB report on the mishap states.

A contributing factor was the pilot's negligence in planning a flight into an area in which adverse weather conditions were forecast without making adequate provision for a suitable alternate airport, the board asserted. All 13 persons aboard the craft, bound from Oakland, Cal., to Newark, N. J., on a nonscheduled flight, were killed in the crash.

Having learned that both his destination (Cheyenne) and alternate (Denver) had lowered to below minimum safe weather conditions, and having been advised that Laramie weather was being reported below safe minimums, the pilot should have requested assistance from Laramie radio in selecting another alternate, CAB declared. Instead, the pilot elected to attempt an approach at Laramie.

"Judgment of the pilot can be questioned further because of his repeated attempts at aligning his plane with a runway at Laramie after having observed that weather conditions there were extremely adverse (visibility ½ mile, ceiling 400 ft. with snow). Inasmuch as the pilot had almost two hours' fuel aboard, it would still have been possible for him to proceed to a suitable alternate for a safe landing," according to CAB.

In attempting to keep the field in sight while circling the area at a very low altitude the pilot evidently momentarily lost control of the DC-3 by permitting it to bank excessively, and before recovery could be completed a wing tip struck the ground.

CAB Denies Bid For Free Rides

Two attempts by a Congressional committee to get blanket approval from CAB for free overseas air transportation have met with failure.

Turned down were requests of Rep. Charles Wolverton (R., N. J.), chairman of the House Interstate and Foreign Commerce Committee. He sought free transportation to points in Europe, Asia and South America for members of various subcommittees wishing to make studies abroad. Congress failed to appropriate money for the trips before adjournment.

► **Provisions Cited**—CAB stated that the Civil Aeronautics Act prohibits granting the free rides requested. The Act and the Board's Economic Regulations make provisions for free transportation of Post Office officials, airline employes and their families, and a few others, but not Congressmen.

The Economic Regulations state that any carrier desiring special permission to furnish free overseas or foreign transportation for persons not specifically mentioned in the Civil Aeronautics Act may apply to the Board for such authorization. But persons seeking free rides can not apply directly to CAB.

► **Protection Necessary**—This setup is considered necessary to protect the airlines from such abuses of free transportation as have occurred in the railroad industry. Airlines violating the ban on unauthorized free rides can be fined up to $5,000.

CAB recently instituted an investigation of tariffs filed by 17 U. S. and foreign airlines providing for free or reduced-rate transportation for group travel, tour conductors, travel agents and employes, officials and directors of other carriers. The Board felt that this provision might be unjustly discriminatory or unduly preferential. Another investigation initiated by CAB will determine whether Pan American Airways, Panagra and other carriers can give free roundtrip overseas and foreign air transportation to exchange university students between Latin America and the U. S.

UAL Survey

Approximately one-fourth of the passengers riding United Air Lines planes during the period of a recent survey were "first flighters," of whom nearly one-third were women.

Further breakdown of UAL's questionnaires showed that 75 percent of the passengers were flying on business or a combination of official duties and pleasure, while 23 percent were on purely pleasure flights. The remaining 2 percent constituted emergency cases.

Of the passengers filling out questionnaires, 70 percent were men. Over half of the women taking part in the poll said they were on business trips. Age brackets of the travelers: 79 percent over 30 years old; 48 percent over 40, and 24 percent above 50. Fifty-eight percent reported their income was in excess of $5,000.

Immigration by Air

Transocean Air Lines has begun work on its contract with the Province of Ontario to fly 7,000 British immigrants to Canada to help relieve a critical manpower shortage in the Dominion (AVIATION NEWS, June 30). First TAL C-54 operating under the arrangement landed near Toronto, Ont., last week with 38 passengers aboard.

CAB Denies Petitions

CAB has issued a supplemental opinion in the North Central Area case denying petitions for reconsideration of its decision.

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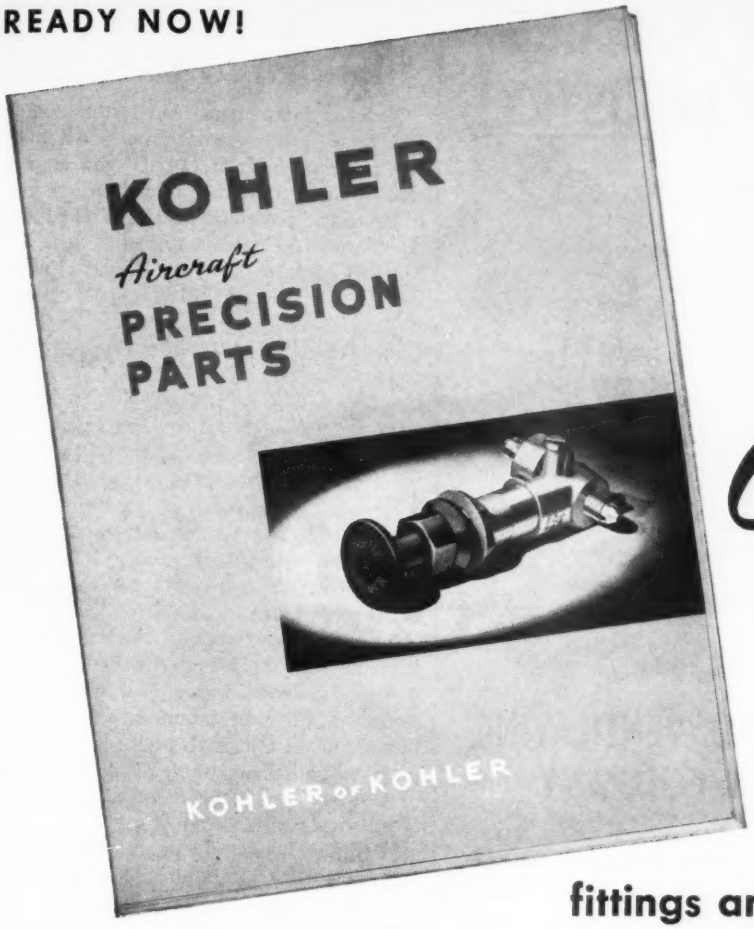

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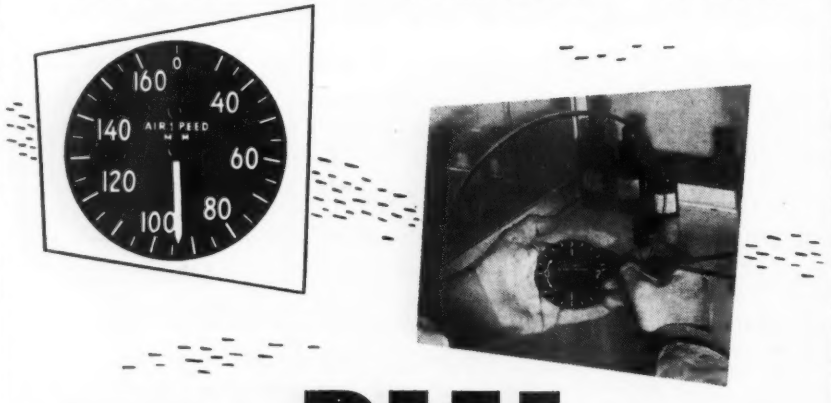

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Peruvian Carrier Admitted to U. S.

Peruvian International Airways has won a foreign air carrier permit from CAB over the protests of U. S. carriers who argued that PIA is in reality not a Peruvian line but a company promoted and controlled by American and Canadian citizens.

With Member Clarence Young dissenting, CAB authorized PIA to operate between Lima, Peru, and Montreal via Balboa, Canal Zone; Panama City, Panama; Havana, Cuba; Washington, D. C., and New York. Peruvian International is already operating its DC-4s between Lima and Havana. It hopes to inaugurate service to the U. S. and Canada with two round trips weekly by fall, later increasing schedules to one flight daily.

► **Top Officials**—President and general manager of Peruvian international is Harold L. George, formerly lieutenant general in charge of the U. S. Army's Air Transport Command. H. S. Hansell, Jr., formerly commanding general of ATC's Atlantic Division, is vice president in charge of operations. Active in PIA's organization, and now a director of the line, is C. M. Keys, formerly president and chairman of TWA, president of Curtiss-Wright Corp., and president of North American Aviation, Inc.

According to the Peruvian government, PIA is owned 40½ percent by Canadians, 32 percent by Peruvians and 27½ percent by Americans. The carrier's board of directors consists of four Canadians, three Americans, three Peruvians and a native Italian living in Peru.

► **Provision Added**—Under the terms of a bilateral air transport agreement between the U. S. and Peru signed last December, the U. S. was given the right to deny a foreign air carrier permit to a company designated by the Peruvian government if substantial ownership and effective control of the airline was not vested in Peruvian citizens. However, at Peru's request, the American State Department also agreed that the U. S. would admit, under the air transport pact, an airline owned at least 30 percent by Peruvians and the remainder by citizens of the U. S. and Canada if within ten years 51 percent of the ownership passes to Peruvian citizens.

In his dissent, CAB Member Young expressed doubt that even 30 percent of PIA's stock is actually held by Peruvians. He said further it is possible that Canadians might obtain effective control of PIA.

Colonial Airlines, which led the opposition to PIA's request for a foreign air carrier permit, did so on several grounds. In addition to questioning PIA's ownership and fitness, Colonial contended that traffic requirements did not justify the intermediate stops requested. Colonial expressed fear that PIA might compete unfairly with U. S. carriers by offering shuttle service between Washington and/or New York and Montreal and between Washington and/or New York and Havana or the Canal Zone.

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SHORTLINES

▶ **American**—Has trained more than 900 pilots at its Ardmore, Okla., base during the past year. With a staff of 175 employes, Ardmore is handling about 135 students a month, including, besides pilots, flight dispatchers, mechanics, stewardesses and agents. Pilot training currently is concentrated on transition from DC-4s to DC-6s.

▶ **British European Airways**—Reports scheduled flights nearly trebled between February and May. Greatest expansion was on the English Division, where trips increased from 457 to 1,775 weekly, up 290 percent. Flights on BEA's Continental Division, which connects England with European Capitals, rose from 143 to 188 weekly, up 33 percent, in the same period. . . . Carrier soon will receive three Sikorsky and two Bell Helicopters.

▶ **Colonial**—Is scheduling 16 flights weekly between New York and Bermuda and four weekly between Washington and Bermuda. . . . Service to Malone, N. Y., was slated to begin this week.

▶ **Eastern**—Set new commercial speed records between New York and New Orleans recently when one of its 60-passenger Constellations made the southbound run in 3 hr. 52 min. and the return trip in 3 hr. 34 min. Carrier has opened regular 4 hr. nonstop service between the two points.

▶ **National**—Inaugurates its "reservamatic" system this week. NAL states it will permit instantaneous confirmation of space requests on any flight between any points on its system regardless of which of its 29 stations receives the call.

▶ **Northwest**—Is flying three roundtrips weekly over its northern route to the Orient.

▶ **Pan American**—Has signed an interline freight agreement with Eastern Air Lines. . . . Regular flights from New York to Damascus, Syria, have been inaugurated.

▶ **Southwest**—Was slated to begin daily roundtrips between San Francisco and Clear Lake, Cal., last week. . . . Carrier has reinstituted service to Coalinga, Cal.

▶ **Philippine Air Lines**—Has opened a Southern California district traffic and sales office in Los Angeles.

▶ **United**—Reports it is now serving more than one-fourth of the U. S. population. Approximately 39,500,000 persons live within a 25-mile radius of the 70 cities which are stops on UAL's system. . . . Carrier trimmed 15 minutes from eastbound and 30 minutes from westbound schedules on its Hawaiian run this month. . . . New ticket office has been opened at 1 Wall St., New York.

EAL Sues Government Over Two Collisions

Eastern Air Lines has filed two civil actions against the Federal Government asking $132,500 damages for collisions which occurred between EAL and Army aircraft.

Largest suit, for $125,000, is the result of a collision July 12, 1945, between an Army A-26 and an Eastern DC-3 near Florence, S. C. The other action, for $7,500, involved a mishap Jan. 23, 1945, at the Nashville, Tenn., airport. In both cases, EAL asserts that the Army planes were "carelessly and negligently" operated.

Responsibility for the Florence, S. C., collision, in which one DC-3 passenger and two occupants of the A-26 were killed, was placed equally on the EAL and Army pilots by a CAB accident report. The DC-3 captain was eight miles off the airway, and the military pilot was practicing turns in an undesignated area. Nobody was hurt in the Nashville accident, which occurred when an Army plane ran into the EAL craft on the ground.

KLM Permit Extended

Foreign air carrier permit of KLM, Royal Dutch Airlines, has been amended by CAB to permit the carrier to continue its Amsterdam-New York services another year.

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(Continued on page 62)

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ADDITIONAL SEARCHLIGHT ADVERTISING ON PAGES 62 & 63

Airlines Promoting Vacations by Plane

Special excursions to attract the vacationist are being offered in unprecedented numbers this summer by the scheduled airlines, with the "play now, pay later" formula increasingly popular. Latest developments include Mid-Continent Airlines' "Budgetour" and Southwest Airways' reduced rates for circle trips over its Northern California feeder routes.

MCA's "Budgetour" is described as a deluxe air vacation from the Twin Cities to California on the easy payment plan. Tourists fly Mid-Continent to Kansas City, connecting there for the run to Los Angeles via TWA. The trip, which carries a 120-day return limit, includes sightseeing tours of movie studios and a drink and supper at a Hollywood night club.

▶ **Credit Feature**—Well-heeled vacationists can pay $223.58 cash in advance for the California "Budgetour." Others have their choice of paying over 15, 12 or 6-month periods, with the total tariff slightly higher on the installment plan.

The easy-payment feature of the California "Budgetour" extends to all air vacations originating over MCA's routes out of Minneapolis-St. Paul, regardless of destination or connecting airline. While at present Mid-Continent's vacation-on-credit plan is available only to residents of the Twin City area, the carrier may set up the same financing machinery at other points on its system.

▶ **Circle Tour**—Southwest Airways has established a special $25 excursion fare for its Northern California circle trip to encourage vacation travel "over the most scenic airline routes in the nation." The circle tour plan permits passengers to start their trip from any city on Southwest's northern routes and fly in either direction—north via Medford, Ore., or south via San Francisco—returning the other way.

Both Southwest's northern coastal segment and its inland link terminate at Medford and San Francisco, thus forming the loop. Stopovers will be allowed at all intermediate points, and the excursion rate represents a saving of up to 26 percent over regular point-to-point fares.

▶ **Camping Trip**—Meanwhile, Braniff Airways is offering a complete three-day all-expense camping tour out of Denver into the mountains for $39.

Other vacation-by-air promotions this summer have included American Overseas Airlines' fishing and hunting excursions to Newfoundland, Chicago & Southern's 16-day tours to Havana, and Capital Airlines' air-water cruises from Washington to the Great Lakes.

Shuttle Halted

The nation's first scheduled helicopter taxi service—operated by Skyway Corp. between a rooftop in downtown Boston and Logan International Airport—has been suspended. Started late in April with three-passenger Sikorsky S-51s, the service was cut from 70 to 14 trips daily early in June because of protests against noise created by the rooftop takeoffs and landings. Inability to achieve a profitable load factor and management difficulties were contributing factors in the decision to discontinue the three-mile shuttle flights.

AIR FERRY BACKERS

Competition for United Air Lines on the short run from the California coast to Avalon, Santa Catalina Island resort city, is being provided by Amphibian Air Transport, Inc. Organizers of the line, which uses surplus 10-passenger Grumman amphibians, are Ken F. Brown, right, president, and C. E. Hunsinger, vice president. Charging the same fare as United, AAT lands in Avalon harbor on its route from Long Beach Airport and Lockheed Air Terminal, Burbank. UAL flies DC-3s from Los Angeles to Catalina's mountain top airport, nine miles and a $1 limousine ride from Avalon.

City Loses Air Service Due to Inadequate Field

A fate which is in prospect for a number of communities having airports too small to accommodate the airlines' postwar equipment has befallen New Bern, N. C.

CAB has given National Airlines permission to suspend service at the city of 12,000 population until such time as an airport suitable for DC-4 equipment is available. In requesting the suspension, NAL told the Board it was discontinuing all Lockheed Lodestar operations north of Jacksonville, Fla., adding that eventually it would be using DC-4s exclusively on its entire system. To continue duplicating Lodestar schedules for the benefit of New Bern —only point among 26 served by NAL which cannot accommodate DC-4s—would cost $13,000 monthly, the carrier asserted.

Jackson Elected Director of AOA

Election of James A. Jackson to American Overseas Airlines' board of directors and appointment of A. Di Pasquale as American Airlines' director of labor relations have been announced by the two carriers.

Jackson is a former president of the Continental Bank and Trust Co. and was vice president of the National City Bank of New York. Di Pasquale, who succeeds the late Lee J. Robinson, was a labor representative and contract negotiator for the Great Atlantic & Pacific Tea Co. before joining American.

Other personnel developments:

• **Braniff**—R. H. Burck, southern region traffic manager, has assumed additional duties as coordinator of state affairs for the carrier.

• **CAB**—Sydney B. Smith has been named chief of the foreign air transport division of the Board's Economic Bureau.

• **California Eastern**—Robert E. Caskey, formerly cargo sales manager for United Air lines at Chicago and Los Angeles, has been appointed assistant to the airfreight carrier's vice president in charge of sales.

• **Continental**—George D. Rash has been promoted to traffic manager.

• **Florida Airways**—Frank H. Patterson has been named superintendent of stations and R. E. Brumbaugh has become traveling sales representative.

• **Independent Airfreight Association** — Elected following officers at a recent meeting of trustees: Earl F. Slick, Slick Airways, president; Robert W. Prescott, Flying Tiger Line, H. R. Playford, U. S. Airlines, C. F. Willis, Jr., Willis Air Service, and J. J. O'Brien, California Eastern Airways, vice president; Col. L. H. Brittin, executive director and treasurer; and H. Struve Hensel, general counsel.

• **National**—Ruth M. Blackburn has become assistant chief stewardess.

• **United**—W. B. Frank has been named chief of cargo sales in Southern California succeeding R. E. Caskey.

Swiss Seek Route

Another European country, Switzerland, is preparing to enter its national airline in the already hot contest for Trans-atlantic traffic. Swissair (Swiss Air Transport Co., Ltd.) has asked CAB for a foreign air carrier permit to fly to New York over a northern route via points in Eire and Newfoundland and over a second link by way of the Azores.

CAB SCHEDULE

Aug. 11. Hearing on All-American Aviation's mail rate case . (Docket 1906.)

Sept. 2. Hearing in Latin American Certificate Amendment cases of Panagra and Braniff. (Dockets 2527 and 2622.)

Sept. 2. Hearing on Pan American Airways' application for route consolidations and extensions in Latin America. (Docket 2811.)

Sept. 8. Hearing on Mid-Continent's proposed service between Minot, N. D., and Regina, Saskatchewan. (Docket 628.)

Sept. 8. Hearing in Chicago Helicopter's Service case. Extended from Aug. 18 (Docket 2811.)

Sept. 8. Hearing in case involving additional service in California-Nevada area. Postponed from Aug. 25. (Docket 2109 et al.)

Sept. 10. Hearing on CAB's investigation of TWA-Hughes Tool Co. relationships. (Docket 2796.)

Sept. 29. Hearing on Mid-Continent's application for alternate Kansas City-New Orleans Route. (Docket 1956.)

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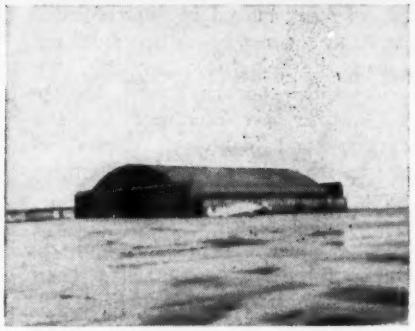

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(Continued from page 60)

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(Continued on opposite page)

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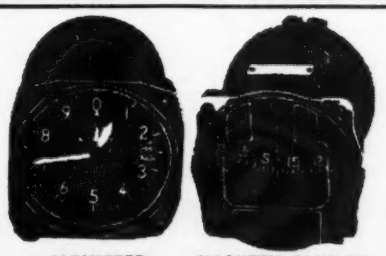
W-1471, Aviation Week
330 West 42nd St., New York 18, N. Y.



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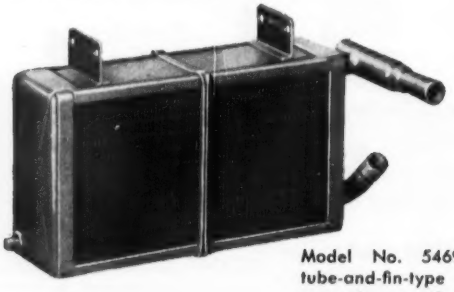

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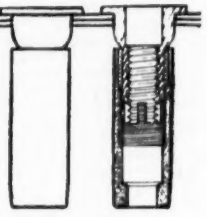
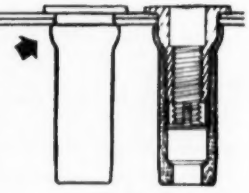
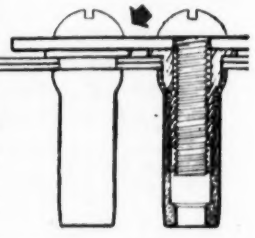


3 Riveted securely by drawing sleeve against inner side of metal with special power or hand tool.



4 Attachment fastened by screw locked in anchor nut.



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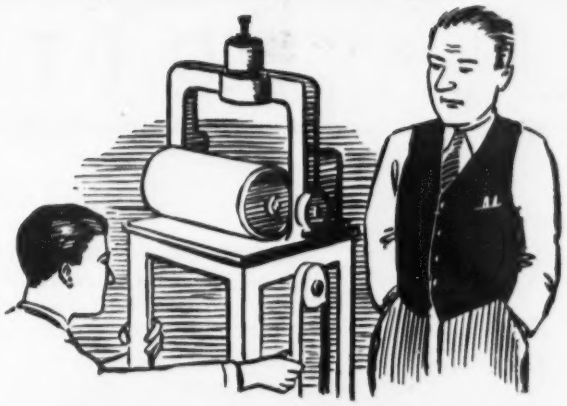

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EDITORIAL

Shop Talk by an Editor

With apologies to those who prefer regular editorials, we shall restrict this page to shop talk today on several current matters which are probably more important to the editor than the reader, but we must have our say to clear the air.

Official Denials—Every live publication worth its salt publishes important information first with a high degree of accuracy. No publication, of course, is perfect. So the goal of the staff is to achieve as near 100 percent accuracy as possible. A magazine like AVIATION WEEK is concerned with reporting of facts and of industry opinions and trends. You would imagine that a magazine with an excellent accuracy ratio would be free of criticism, relatively. That is not the case. It may be castigated for hitting the mark too often.

AVIATION NEWS on March 3 reported discussions going on between high officials of TWA and Pan American "looking toward consolidation of the TWA and PAA systems." A newsletter greeted this story with the comment that although Howard Hughes and Juan Trippe had had a meeting the "speculative story in an aviation weekly . . . . is not given credence in informed circles." But Mr. Hughes the other day gave the story considerable credence by verifying the information.

The AVIATION NEWS story, which was widely used by the daily newspapers, was denied very emphatically by a TWA vice president in Kansas City, and the company's house organ, as we recall, carried a rather scathing denunciation of AVIATION NEWS, our predecessor journal.

The official told company employes that such reports were "erroneous and irresponsible" and "without authentic foundation." We have decided since that Mr. John Collings may not have known who Mr. Hughes talked with. In which case Mr. Collings may have been sincere. But it does seem to show that companies which issue strong official denials of news stories later proved correct are hoodwinking the public and making it more difficult for anyone to believe honest denials thereafter.

Industry Opinion—Every industry magazine such as AVIATION WEEK, in addition to covering the detailed news, attempts to assay trends and opinions in the industries it serves. It does this to the best of its staff's ability. In our July 28 issue we reported in The Aviation Week page the consensus of U. S. air transport officials interviewed on the relative merits of certain aspects of the various foreign-owned airlines. Two airlines protested, as is their right, and we are pleased to offer their side of the matter in this issue.

Censorship and What Is Confidential—What is confidential matter? It depends on the person you ask, and when you ask him. There is not an issue of AVIATION WEEK or any other publication which probably does not print many things which someone considers confidential. Otherwise there would be no press. The press is under no censorship law in peacetime. So it is no particular surprise to us that AVIATION WEEK has been accused directly and indirectly of publishing confidential information. Who doesn't?

The director of public relations of a large company wrote the business department of AVIATION WEEK the other day protesting an Industry Observer item on a new military airplane. He wrote "to say that we object to the publication of that paragraph is putting it mildly. The status of the aircraft in question, as your editor and his staff certainly must know, is highly confidential. Nevertheless, so far as we can ascertain, no effort was made before publication to check on the story or the confidential nature of the subject. . . . Frankly I think such flagrant contempt for the rules is inexcusable . . ." etc.

In the first place, the editors would have appreciated it if the letter had been sent to the people who write this magazine, instead of to the advertising department. No check was made with the company in advance because under such circumstances the company is not permitted to comment. The reference to rules is baffling because as a U. S. government contractor this company has its own rules, which are also those of the Army and Navy and none other.

In peace time military and naval people place their own classifications of secret, confidential, restricted, and others, on their own business. These labels govern what Army and Navy and other Government departments and their personnel may and may not talk about publicly. As far as those Government departments are concerned, those labels are binding. Government contractors are under essentially the same restrictions.

Any realist in these peacetime United States knows that the confidential label is so threadbare in the Government that it is slapped on virtually everything that has not yet been made the subject of a press release, including lists of officer promotions. It is rather obvious that a promotion list cannot endanger the security of the United States. What can? There the experts all disagree.

No one has struck at the heart of the censorship problem more convincingly than Gill Robb Wilson, valiant World War I flyer, former preacher, author, and sage observer of life. "How strong is America in the air?" he asked the other day in his New York Herald Tribune column. "Everyone knows except the American people. The Russians know in detail. So do the British, and the French and the Swedes. So does every able intelligence system of every nation on earth. Everybody knows except the people who could do something about it, if they knew."

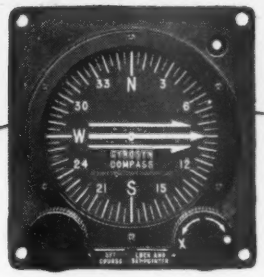
And why do they not know? That story, Gill Wilson says, originates away back yonder with the Old World idea that "what goes on in the military establishment is none of the civilians' damn business." Against that idea, he says, our founding fathers set their faces when they required that the Secretaries of War and Navy be civilians.

"Nevertheless," Wilson adds "there has been a constant struggle within the military forces against men who did not understand that power—all power—in a democracy stems from the people . . . Historically War and Navy with deliberate purpose have not informed the people on everything that could be told safely. This in spite of the fact that such knowledge was unquestionably in the hands of the intelligence systems of other nations."

Gill Wilson decides now is a good psychological time for the military establishment in all branches to review the entire problem of public relations and military intelligence. AVIATION WEEK agrees wholeheartedly.

In the meantime, despite those wire tap clicks on two of our four Washington phone lines, AVIATION WEEK hopes to continue to inform the people, and aviation people specifically, on the significant developments which can mean so much to the country, and perhaps to the rest of the world.

ROBERT H. WOOD



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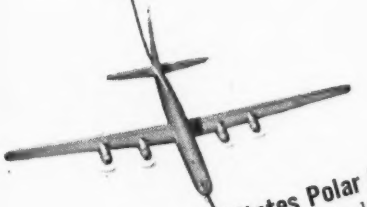

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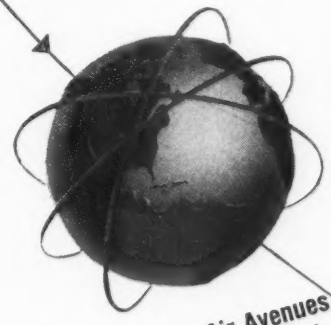

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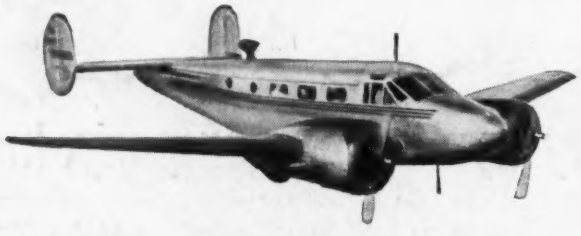

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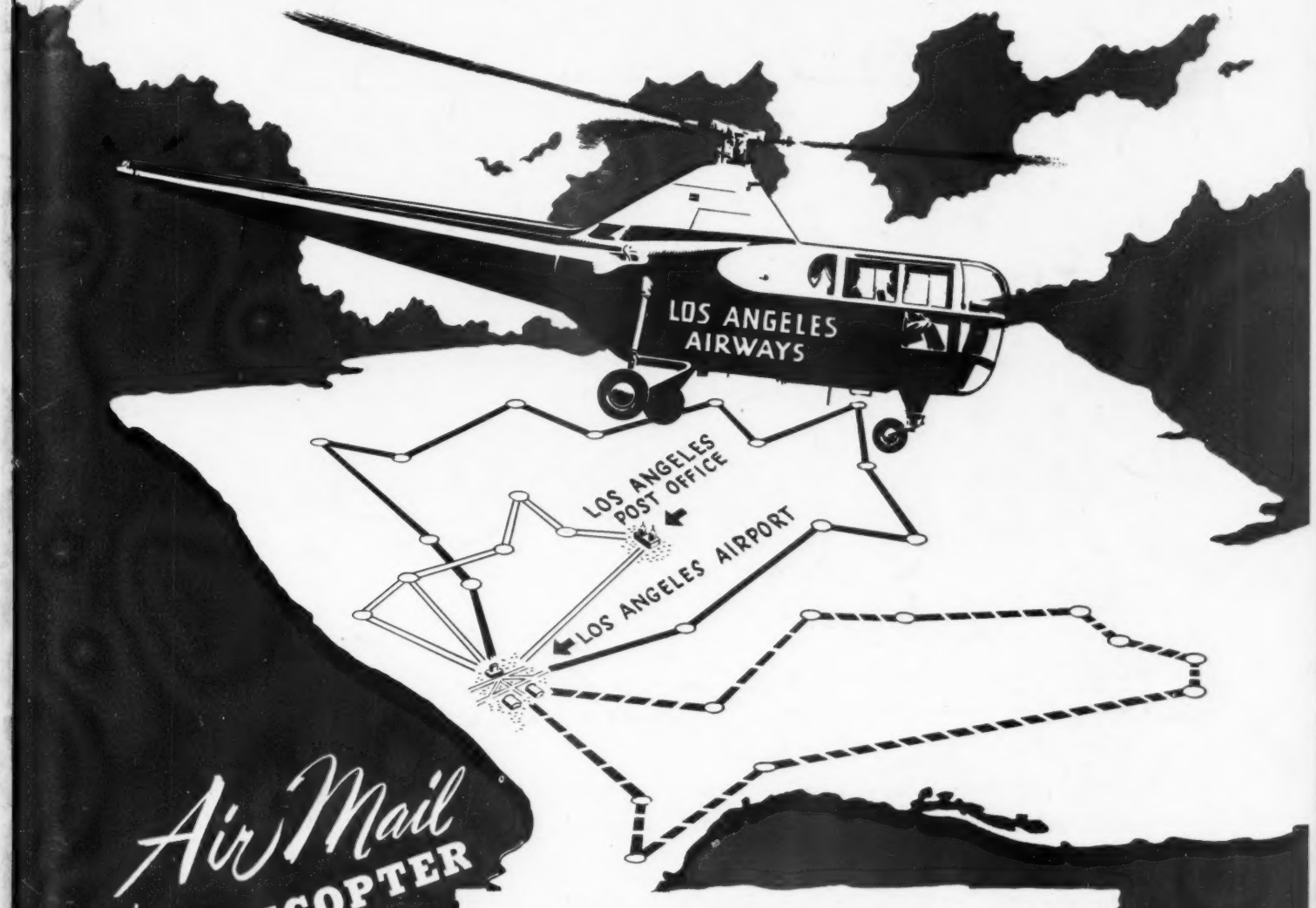

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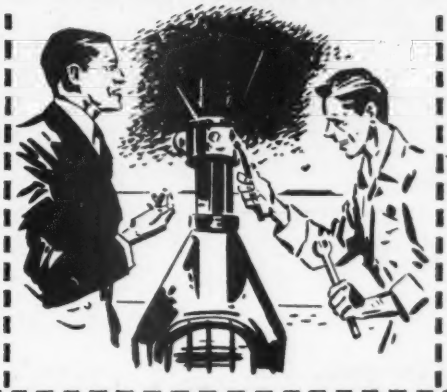

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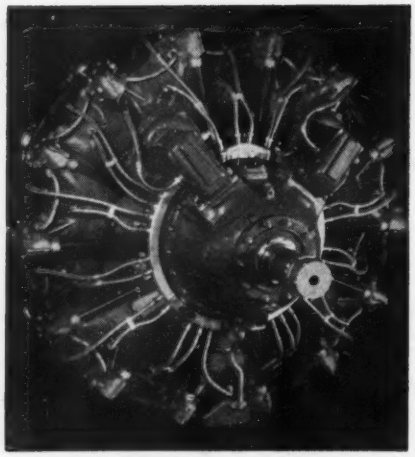

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AVIATION WEEK

Vol. 47 No. 7

INCORPORATING AVIATION AND AVIATION NEWS

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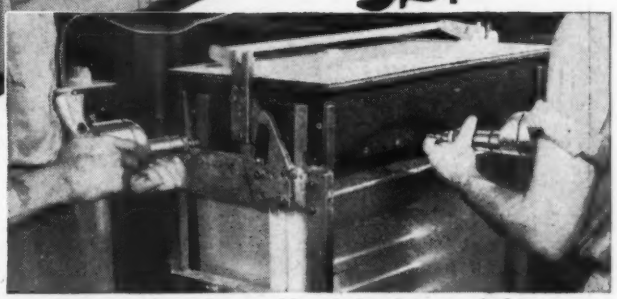
Summary of report by James O. Peck Co., independent investigators, of assembly savings made with Phillips Screws . . . another in the series of assembly studies at prominent plants.

THE ICEBERG REFRIGERATED LOCKER COMPANY'S equipment for frozen food storage is made up in combinations of basic units like this 8-section (10 six-cubic-foot drawers to a section) locker.



The complicated assembly of the drawer of the ICEBERG REFRIGERATED LOCKER . . . made without driver skids to injure work or hands, thanks to Phillips Screws.

Most of the thousands of Phillips Screws used in this assembly are Type "A", self-tapping, and are power driven up, down, and sideways.

● "We manufacture these units for the Iceberg Refrigerated Locker Systems, Inc," explained the assembly head of The Globe Wernicke Co. "Our engineering department specified Phillips Screws throughout, and we're glad they did.

"Save us $50 worth of assembly time per unit. We can take full advantage of power drivers with Phillips Screws. No finder is needed and there's no fumbling such as we'd have with slotted screws. Since each unit requires thousands of screws, $50 is a conservative estimate of how much we save per unit by using Phillips Screws.

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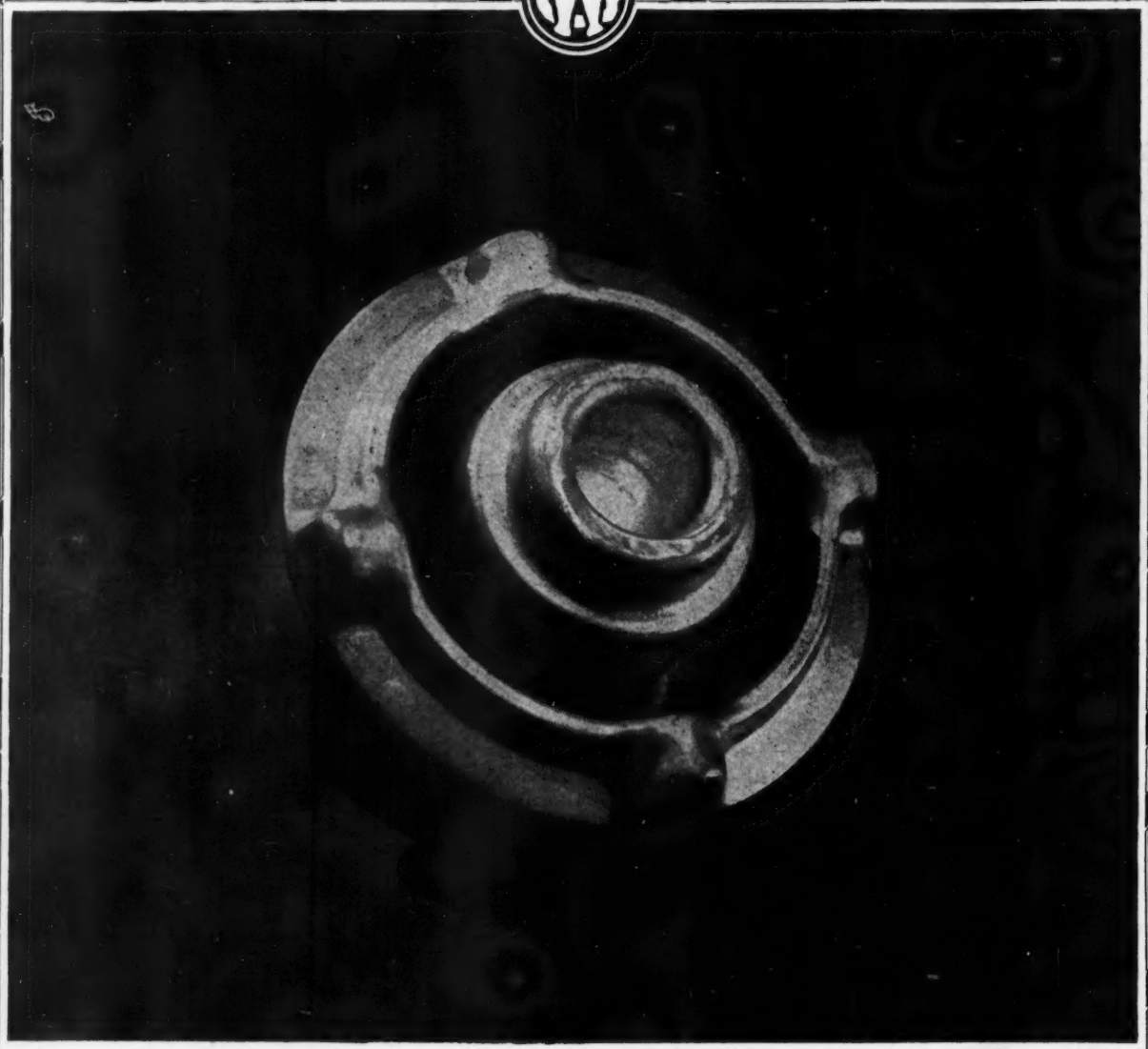

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THE AVIATION WEEK

THE CURTAIN FALLS—Like a Broadway extravaganza whose star has been taken ill, the Hughes investigation ended its run suddenly, and for somewhat the same reason—disappearance of the lead supporting player, John W. Meyer. That was the official reason, at least, although he could hardly tell the investigating subcommittee anything they had not previously learned from him in executive session.

Whether or not the investigation is resumed on Nov. 17—and there are few in Washington at this juncture wagering it will be—and despite its serio-comic overtones, the klieg-lit show in the Senate caucus room has some deep implications being given sober study.

END OF VAUDEVILLE—Probably first and most important for industry in general is that right now Senators of both political faiths are in the mood to assure that there will be no repetition of the Hughes-type inquiry. It evolved into a personal feud. Passing over the public standing of the duelists, the feeling is that the dignity and authority of the United States Senate was the innocent bystander that got hurt. Just what a congressional investigating group could do to prevent a publicity campaign by a person under scrutiny, these senators cannot decide.

Perhaps it will blow over, but at present there is an inclination to overhaul congressional investigatory procedures. In the future this might result in less of an opportunity for companies under investigation to state their cases publicly.

Just as likely, however, is a procedural change that would give those summoned before a congressional committee the same rights as their accusers to be represented by counsel and to call witnesses. One reason for Hughes publicity campaign was that he knew that under usual Senate investigatory procedure, he would not be permitted to state his case in his own way.

SUMMING UP—Summing up the results of the Hughes investigation, it appears to some observers that Howard Hughes succeeded in doing two things potentially of more importance that casting doubt on the truthfulness of Sen. Owen Brewster. One, with Elliott Roosevelt, he put on public parade the lack of faith in the judgment and ability of some Wright Field officers that is shared by scores of manufacturers and military flyers. Top-level officials of the industry have long resented the fact that Wright Field claims as its own, developments worked out by manufacturers. Two, Hughes put himself in the role of a man who only wanted to help his country and was prevented by the Army and aircraft industry, jealously working together.

Observers shudder at the thoughts of a further investigation to determine whether favoritism has governed the awarding of aircraft contracts.

BETWEEN THE ACTS—Sudden ending of the Hughes inquiry left a gap, an intermission in the drama of the aircraft industry in Washington. Next act will feature the air policy groups—the President's commission and the joint congressional committee. But neither is ready for curtain call. Next meeting of the President's commission is tentatively set for this week and with the selection of the executive director, the commission should be about ready to announce its method of procedure.

The congressional group, on the other hand, has given no indications of beginning organizational work. One of its key figures is Sen. Brewster who is on a month's vacation.

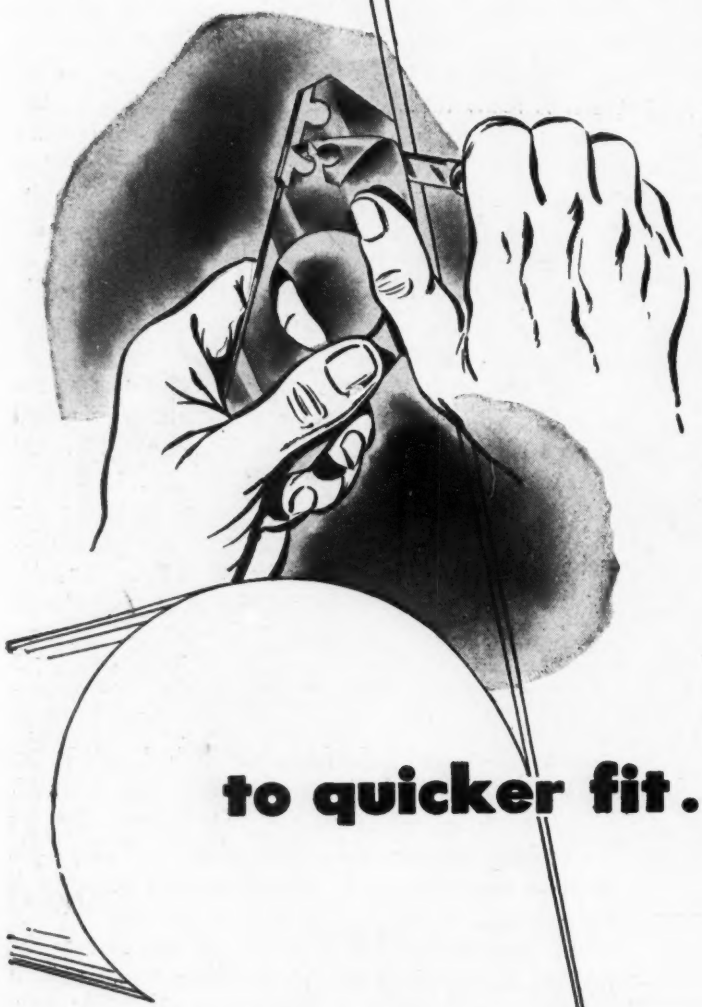
Quiet, too, is the status of the Air Force under the unification law. By mid-week, Secretary Forrestal had not taken the oath of office as Secretary of National Defense. Until he does, there is no separate United States Air Force. Until there is a USAF, the Air Force must live under the housekeeping of the War Department. Under these circumstances, the Air Force is like an involuntary guest who wants to go home and whose host won't let him.

TWO YEARS TO GO—Chief complaint of the War Department's guest is the help, or lack of it. Even while he was undersecretary, Secretary Kenneth Royall began drastic personnel cuts. He is still going strong. The Air Forces, which has relied on the War Department for housekeeping purposes, sees some of the skilled people that have been trained by it and worked only for it slipping away.

That just makes the problem of organizing the USAF more complicated. That organizational task, it is now estimated, will take two years to lick. At best, work has already begun on one of its main points: the budget. While AAF has in the past prepared its own budget, to be included in the War Department estimate, the USAF budget is something else again.

NO CHANGE IN RESEARCH—Pre-occupied with their analyses of the Hughes investigation, aircraft industry representatives in Washington gave little thought to the President's veto of the bill establishing a National Science Foundation. Their interest in it has not been as great this year as it was a year ago because the patent-reform sections in last year's bill were not included this time. As the bill authorized the foundation but carried no appropriation, it would have given little immediate help to the industry's research aims.

ADD PRESSURE SEAL



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NEWS DIGEST

DOMESTIC

S. Paul Johnston, director of the Institute of the Aeronautical Sciences, has been named Executive Director of the President's Air Policy Commission.

Howard H. Rosenheim has resigned as civilian chief of the Army Air Forces industrial preparedness program at Wright Field to return to private industry in the Chicago area. He is a former Air Forces major.

Braniff Airways, which last November asked CAB to increase its mail pay to 20 cents a plane mile, has amended its petition in the still-pending case and now seeks 30 cents a plane mile.

Mid-Continent Airlines has asked CAB to amend its route 26 certificate to extend beyond Tulsa to Fort Worth-Dallas. The carrier also asks that Fort Worth-Dallas be made an intermediate point on route 80.

Pan American Airways reports a 98 percent increase in passenger traffic between U. S. and Alaska in July over the same month a year ago.

FINANCIAL

Curtiss-Wright Corp. reports a consolidated net loss of $241,837 for the six months period ending June 30. This loss is after applying tax carryback credits of $5,000,000 and after the transfer of $665,511 from post-war conversion reserves. Net sales were $38,687,453 and backlog is $130,000,000. Directors voted a $1 dividend payable on Sept. 15 to stockholders on record Aug. 22, to be paid out of previous earnings.

Republic Aviation Corp. reports a net loss of $476,205 for the first six months of this year after a tax carryback credit of $2,470,209. Sales for the period were $12,230,260 and unfilled orders amount to $70,000,000.

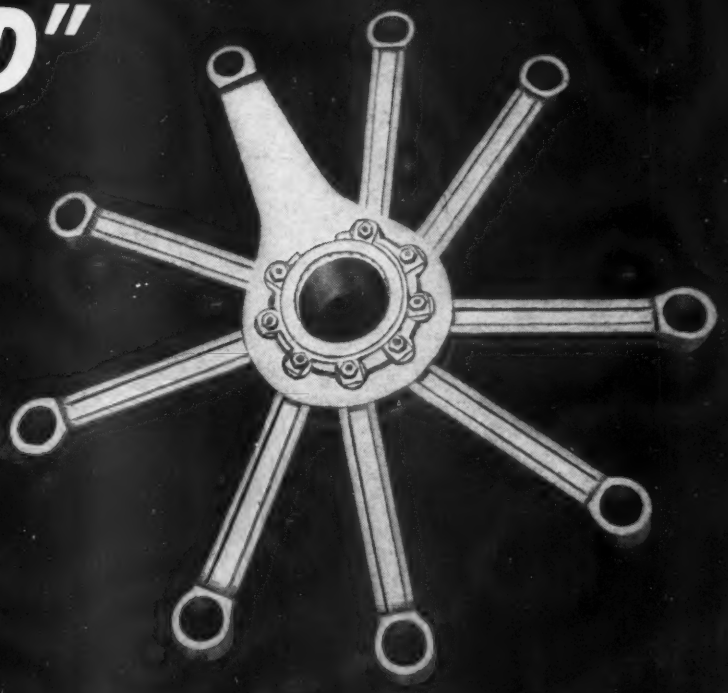
Pacific Finance Corp., non-aviation subsidiary of Lockheed Aircraft Corp. reports a $395,546 net income for first-half of the year, equivalent to $1.06 per share. Lockheed holds 95 per cent in this installment finance corporation.

FOREIGN

Moscow Radio reports the opening of a new airline between Moscow and Kabul, Afghanistan. The 2500-mile route crosses 16,250-ft. peaks in central Asia.

England has completed conversion of the corvette Marguerite to weather observer, the first of four British weather ships to be maintained in the Atlantic. The weather observer hull is painted black with yellow superstructure. She will be stationed 300 miles west of Ireland to report weather and provide navigational and rescue service for aircraft.

"SOLID"



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Reg. U. S. Pat. Off.

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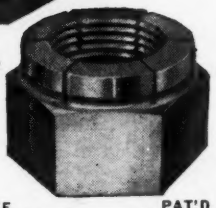

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AVIATION WEEK

AUGUST 18, 1947

INCORPORATING AVIATION AND AVIATION NEWS

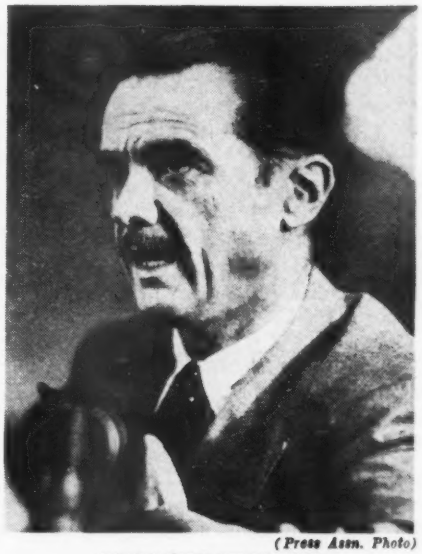
Senate Probe of Hughes Ends Abruptly with Meyer Missing

Exclusive AVIATION NEWS story on TWA-Pan Am merger confirmed by sworn testimony of Hughes and Brewster

Senate War Investigating Committee's probe into the wartime contracts of Howard Hughes collapsed abruptly last week after two weeks of hearings failed to produce any evidence of fraud or collusion in procurement of the XF-11 photo reconnaissance plane and the HK-1, 220 ton plywood flying boat.

Official reason was the failure of the committee to locate John Meyer, Hughes public relations man, who had already testified extensively in executive and public sessions, for further testimony. Hearings are scheduled to be resumed in November.

Hughes regarded the abrupt cancellation of the hearings as a personal vindication in respect to both his wartime contracts and his personal feud with Maine's Senator Owen Brewster (R.) over charges that Brewster used threat of investigation to attempt to push Hughes into a TWA-Pan-American Airways merger and support of the community airline bill sponsored by Brewster, among others. Brewster left Washington for Maine three days before the abrupt termination.



(Press Assn. Photo)

HOWARD HUGHES

(Press Assn. Photo)

PAA "HOUSE ON F ST."

▶ **Confirm Av News Story**—Both Hughes and Brewster, in sworn testimony, confirmed the exclusive AVIATION NEWS story of March 3 stating that conferences on the TWA-Pan American merger were under way between Hughes and Pan American officials. The story was widely denied.

Hughes said merger discussions began the week of Feb. 10 at a dinner in the Mayflower Hotel in Washington with Juan Trippe, PAA President. Hughes subsequently sent Noah Dietrich, executive vice-president of Hughes Tool Co. to New York to confer with Trippe on the merger. Dietrich told AVIATION WEEK that he had five separate meetings with Trippe. Dietrich reported to Hughes that it was not possible to "make an equitable deal" with Trippe and was told by Hughes to drop the matter temporarily.

It was after this decision, Hughes charges, that Francis Flanagan, assistant counsel for the Senate committee, turned up in Los Angeles and "started getting tough."

▶ **Palm Springs Conference**—"Up to that time everything had been friendly," Hughes said. "I felt the timing was an application of the screws by Brewster after my refusing Trippe. I called upon Trippe and said there is no chance of our getting together unless we deal in person.

"Trippe said he could come to California and we had considerable discussions at Palm Springs in early April. During the course of these discussions I asked Trippe what he would do about Brewster. He said he would talk to Brewster when he returned and get him to hold up the investigation and hearings on the Community Company Bill until we got together. Trippe talked about Brewster as though he (Brewster) worked for him (Trippe)."

Hughes repeated under oath his charges that Brewster had "in so many words told me at luncheon in Brewster's suite in the Mayflower that if I would merge TWA with Pan American Airways and go along on the community company that there would be no further hearings in the investigation."

▶ **Brewster Denial**—Brewster denied the charges but admitted that he had partaken of Pan American hospitality at its house at 2017 F St. NW in Washington, at least to the extent of three ham and egg breakfasts with PAA Vice-President Sam Pryor, during the past six months. He described the PAA house in detail and gave photographs of a luxurious house TWA formerly

(Press Assn. Photo)

NOAH DIETRICH

maintained in Arlington, Va. Brewster also admitted taking free rides in the Pan American executive plane to Raleigh, N. C., to confer with the late Senator Josiah Bailey on the Community Company Bill; from Atlanta to Hobe Sound, Fla.; and then to Miami where he embarked on a trip around South America via PAA. Brewster produced a cancelled check to PAA for $2,028 dated Dec. 2 as evidence of his payment for the trip. His trip began late in November.

In evaluating opposition to the Community Company Bill, Brewster said that Jack Frye and the two Wilsons—T. B. and Arthur—were of lesser influence than C. R. Smith and Ralph Damon of American Airlines.

▶ **Pan Am Investigation Question Mark**—Tom Slack, Hughes attorney, asked Brewster if he favored an investigation of Pan American Airways. Brewster agreed that the whole question of lobbying by airlines and other corporations "should be the subject of a searching inquiry." Brewster also indicated he thought the award of overseas routes by the Civil Aeronautics Board could bear official investigation.

Hughes cited two stories from AVIATION NEWS as alleged evidence that Brewster was putting pressure on him to support the Community Company Bill in Washington last spring. Partial transcript of a telephone conversation between Hughes in Los Angeles and Brewster in Washington regarding the AVIATION NEWS story of March 3 was also introduced in the testimony. Hughes said the AVIATION NEWS story produced a flood of press queries and that he eventually denied the TWA-PAA merger because "it put the whole TWA organization into a spin."

Strike Threatens Halt At PAC Center

Pacific Airmotive Corp. may close its important Oakland, Cal. engine overhaul center as the result of a jurisdictional strike that already has resulted in 105 workers being paid off.

A dozen supervisory employees last week were passing picket lines to complete the assembly of 27 airline engines that were in work process when the strike was called by International Association of Machinists. All other engine overhauls are being diverted to the company's home plant and main overhaul facility at Burbank, Cal.

Unusual aspect of the strike is that it resulted from IAM's apparent success in converting virtually the entire membership of an independent union holding a PAC contract, Amsco Employees, Inc.

In preliminary conferences with a U. S. labor conciliator, PAC has insisted that even though IAM evidently holds complete command of all or most of 105 shop workers the existence of a contract with Amsco prevents the company from bargaining with IAM.

Hughes Vs. Wright Field

Evidence of long-smoldering antagonism between planemaker Howard Hughes and what Hughes termed "the clique at Wright Field", lead by Maj. Gen. Oliver Echols, now AIA president, flared at the closing session of the Senate War Investigating committee hearings on Hughes $18 million flying boat and $22 million reconnaissance plane contract.

Hughes re-iterated a charge, previously made by Noah Dietrich, Executive Vice President of Hughes Aircraft, that Echols barred Hughes from participating in the wartime aircraft program because of "personal dislike." He quoted Echols as stating that he "would never be a party to a deal with Hughes," added that "this feeling was prevalent throughout Wright Field," and commented "that is the reason I had one percent of the war plane contracts" and wound up with 100 percent of the investigations.

The three factors which piqued Wright Field officials, Hughes said, were (1) his failure to stop off at Wright Field, as promised, in 1937 after making transcontinental record-breaking flight, (2) the refusal of his assistants (which Hughes said he regretted) to permit Gen. H. H. Arnold to inspect his D-2 prototype, being constructed privately because of Wright Field "brush-offs" to a previous plan, and (3) his failure "to extend hospitality to AAF officials as other manufacturers did" created the impression among Wright Field officers that he was "a rich man who hid out in Hollywood and considered himself above associating with them." As a result of this feeling Hughes said he hired Johnny Meyer as his public relations man.

AVIATION CALENDAR

Aug. 19—International Air-Transport Association, financial committees, Paris.

Aug. 21-22—West Coast transportation and maintenance meeting, Society of Automotive Engineers, Biltmore Hotel, Los Angeles.

Aug. 25—International Air Transport Association, financial-accounting and statistical subcommittee, Paris.

Aug. 25-27—Second annual WASP reunion, Ponca City, Oklahoma.

Aug. 26-29—Pacific general meeting, American Institute of Electrical Engineers, San Diego, Calif.

Aug. 28—International Air Transport Associaton, financial-clearing house subcommittee, Paris.

Aug. 30-Sept. 1—National Air Races, Cleveland, Ohio.

Sept. 1-4—Fall meeting American Society of Mechanical Engineers, Salt Lake City.

Sept. 1-10 — International Air Transport Association technical conference, Nice.

Sept. 3—International Air Transport Association, financial committee, Brussels.

AAF Begins Tests With Bell XS-1

Bell proposes slow approach to supersonic.

Army Air Forces last week began new flight tests of the Bell XS-1 with Capt. Charles Yaeger as pilot. As soon as Yaeger completes a series of familiarization flights, a first attempt will be made to push the plane to supersonic speed. Under Army contract terms Bell Aircraft's XS-1 pilot, Chalmers Goodlin, held the speed of the rocket plane to slightly over Mach. 8.

If Army follows a procedure proposed by Bell Aircraft, approach to supersonic flight will be made in a series of uniform steps. R. M. Stanley, Bell vice president of engineering, suggested that highspeed flights begin with a level flight as Mach .8 for 184 seconds on one rocket tube followed by a climb at 4 deg. using all four rocket tubes until fuel is expended.

▶ **Climb Best Position**—During the 45 deg. climb the pilot would be in the best possible position either to cut power and retreat or "stretch his luck' if the plane should begin an anticipated "tuck under' in the vicinity of Mach 1.

Succeeding flights would be made with a shorter initial flight on even keel and gradually extended climb at 4 deg. Should no unfavorable results obtain, a final "all out" phase would call for a near-vertical climb at full power immediately after launching from the B-29 "mother".

▶ **Mach 1.35 Goal**—Stanley told members of the Institute of Aeronautical sciences, meeting in Los Angeles, that the present XS-1 should be able to attain a mach reading of 1.35 in a 45 deg. climb. With turbine pumps feeding the rocket motors the plane's designed speed would be close to 1500 mph., approximately mach .2.

While some consideration has been given to attempting transonic flight under a zero lift condition by having the XS-1 describe a gradually increasing dive, Bell officials favor the 45 deg. climb procedure as one that will give the pilot uniform time and performance check points during successive flights.

Bell's high-speed test phase was to have taken approximately six months. How closely the plane may approximate designed performance estimates may not be learned, with a new pilot at the controls, until next spring. XS-1 performance originally was calculated in startling terms before the proposed turbine pump fuel feed was shelved temporarily in favor of the somewhat less efficient nitrogen pressure feed now in the airplane.

The XS-1 theoretical climbing speed was estimated to be 120,000 ft. min. at an altitude of 120,000 ft., or close to 1400 mph.

Congress Leaves Better Record on Aviation Bills

Separate air force biggest achievement of first session of 80th Congress. Truman vetoes Research Foundation.

The first session of the 80th Congress wrote a mildly progressive record in aviation, with two major accomplishments—because of their fundamental importance to a vigorous airpower program—offsetting many of the things left undone.

Legislation unifying the armed services and correlating national defense with industrial mobilization and foreign policy, bitterly opposed by the politically-potent Navy Department for the past decade, was enacted. When the President affixed his signature to the measure establishing an over-all national military establishment, the air force for the first time was given co-equal status with ground and naval forces.

Although some view the unification measure a bureaucratic grouping of three separate services—departments for Air, Navy, and Ground forces—under an over-all agency to give a semblance of integration, the measure, at a minimum, is the basis from which real armed services integration can evolve.

Credit for enactment of the unification measure goes largely to Sen. Chan Gurney (R., S. Dak.), chairman of the Senate Armed Services Committee. Gurney pushed the measure through, when opposition of congressional naval spokesmen, coupled with a jammed agenda appeared to have blacked-out its chances.

Legislation setting up a National Research Foundation—backbone for an aggressive program of research in aviation and other fields—after arduous work by its sponsors, led by Sen. Alexander Smith (R., N. J.), was approved, only to meet with a White House veto. The measure had been left to die by the 79th Congress. Outlook for re-passage of a revised version of it in the next session is dark.

Certain aspects of the performance of this Congress on aviation matters lend themselves to criticism, but taken all-in-all compromise a commendable record, particularly by comparison with the records of previous congresses.

Appropriations for the Military and Naval aviation programs buttressing the United States foreign policy were skeptically scrutinized and trimmed. They were not heavily slashed, as widely anticipated, in the all-out drive of Republican Congressmen to effect economy in government.

► **AAF Boost**—AAF was awarded a $1,259,272,000 appropriation—substantially more than last year's $1,064,500,000. Navy's Bureau of Aeronautics faired less happily. Its $748,000,000 appropriations was below last year's $780,760,000. Indicative of the Congressional intent to back vital national defense programs with funds was the fact that the $75 million proposed by the budget bureau for BUAER's research and development program, and the $145 million proposed for AAF research were untouched by the Congressional economy ax. In addition, the $43 million voted for National Advisory Committee for Aeronautics was $12 million more than last year's allocation.

Heaviest blow to aviation probably was the session's action in slashing $70 million off proposed appropriations for CAA, and reducing the administration's budget to $119 million, or $5 million below last year's allocation. The Congressional action on CAA was prompted by skepticism of its administration, specifically, the mounting ratio of its administrative and other "non-productive" personnel to the size of its program and to the number of operating personnel.

► **Angry at CAA**—Impatience over CAA blunderings, failure to push war-developed radar, and lack of cooperation with the military on a uniform national air safety program accounted, in large measure, for the ruthless slash of $17 million made in CAA funds for new safety facilities. This left the Administration $11 million for its 1948 fiscal year program.

A disapproving view was taken on the "subsidy" rates set for airmail by CAB. But both the board and the Post Office department were cleared of responsibility for the situation, and promise was made for legislation changing the method of airline subsidization. CAB was given a $3 million appropriation ($500,000 over last year) to catch up on its overloaded agenda.

Both houses devoted months of effort on hearings on the already thoroughly-aired chosen instrument proposal. Legislators in both houses so decisively rejected the plan that its advocates withdrew their fight. This leaves the proposal unconclusively defeated, with its proponents poised to revive it at an opportune time.

► **Major Failing**—The major failing of the first session of the 80th Congress was what it left undone. Important aviation measures—some of them in the last lap—were left incompleted.

The Armed Services Procurement bill—bringing order out of the chaos of overlapping and conflicting procurement regulations of half a century and paving the way for negotiated contracts for aircraft development and research—missed Senate approval in the last minute rush. It will probably be passed the first day of the new session. The same thing happened to the bill removing the Vinson-Trammel Act's outmoded provisions stipulating 12 percent profit ceiling on military and naval aircraft and requiring the Navy to obtain 10 percent of its aircraft from government plants.

► **Left Agenda**—Congress adjourned without considering numerous measure vital to the nation's science program—authorizing an increase in NACA personnel to 17 members,

WHITE HOUSE ADVISERS

Presidential Air Policy Commission at first meeting: seated, left to right, George P. Baker, vice-chairman; Thomas K. Finletter, chairman; Arthur D. Whiteside. Standing, left to right, E. P. Hoyt, and Henry Ford II. (Press Ass'n photo)

authorizing the War and Navy Departments to dispatch personnel to private plants and institutions for training, authorizing AAF to establish a research advisory committee and promoting cooperation between the AAF and private industry on developmental work.

The bill authorizing the War and Navy Departments to hire 45 civilian scientists at from $10,000 to $15,000 a year, however, was enacted. Legislation establishing a clearing house in the Commerce Department to promote the dissemination and utilization of scientific data by small businesses was approved by the Senate Committee on Executive Expenditures, but adjournment blocked further action.

The War and Navy public works bills, approved by the Senate Armed Services Committee, were left for action next year. They carry authorization for a $459,000,000 program of domestic facilities and $200,000,000 for overseas installations, including a $34,000,000 development at the Point Mugu missile testing center and $26,000,000 for an aero turbine laboratory at Trenton.

The session puttered with domestic air transport legislation. A few hearings were held on the McCarran omnibus bill setting up an independent civil aeronautics authority. But the problems requiring legislative solution in the domestic transport field—such as that of multiple taxation—were pushed aside for the chosen instrument show. Numerous omnibus bills (re-writing the 1938 CAA Act in the light of recent developments) were introduced—the McCarran and its companion in the House, the King bill, the omnibus Wolverton bill, reorganizing CAA and CAB and laying down a policy emphasizing maximum competition, instead of regulated competition, the omnibus Brewster bill, following the lines of the Wolverton bill. Action on bills establishing independent air safety board fizzled under the opposition of both the air transport industry and the Commerce Department.

202 Certified

The Martin 202 has been approved by the CAA for airline service, the first postwar twin-engine transport to pass the new, more rigorous CAA certification tests. Approval was granted following a meeting of the Region 1 type certification board.

This approval, in the form of a recommendation to CAA headquarters, has been forwarded to Washington and, barring unforeseen objections, will result in the award of an approved type certificate for the airplane. Current airplanes carry tentative certificates permitting the use of "NC" licenses on the tail. First 202 has received an "NC-93002" license.

Industry Observer

► **McDonnell's new Navy fighter will abandon the wing root location of turbojet units in favor of the lower-drag installation of twin turbojet units in the fuselage belly.**

► Pratt & Whitney may abandon its AAF compound engine development project by mutual agreement following extensive difficulties and rising experimental costs. Although the compound engine (turbosupercharger geared back into engine drive shaft) offers fuel consumption as low as .35 lb. per horsepower-hour (compared to .45-.60 for reciprocating engines) development problems have proved far more complex than even realistic appraisals two years ago. Wright Aeronautical is said to be having the same degree of difficulty on a similar project. Both companies are now dubious of the eventual commercial market for such an engine.

► **Piper Aircraft Corp. reveals that a Cub fuselage costs $90.74 for materials as against $53.26 for a metal structure. Fabrication of the tubing-fabric composite structure requires 20.51 manhours as compared to only 11.20 for a similar metal fuselage.**

► Boeing Aircraft is shooting for a $1,500 price tag on its new lightweight turbojet, although engineers feel that this figure may be two years off pending further design for production. Personal aircraft manufacturers are definitely eyeing the engine for future design purposes.

► **Howard Hughes reveals that difficulties with the control power boost system of the HK-1 is the major delaying factor in the initial test flight of the giant flying boat. His system uses power boost as the sole control method in contrast to the direct mechanical over-ride system used on all other power boost systems as an emergency safety measure.**

► Lockheed Aircraft Corp. is preparing to produce for other manufacturers and wind tunnel operators its "Beman-Weaver Bump," used to obtain transonic airflow in subsonic wind tunnels. Company feels it can be of service to the industry in saving time and engineering costs others would be forced to spend in attempting duplication of the device.

► **Braniff International Airways, first commercial airline to get CAA approval for ILS approaches on its regular schedules, is happy over initial use of the VHF radio beam system. During first 10 days of operations Braniff completed five schedules using ILS that would have otherwise been canceled due to weather below minimum for standard radio range approaches. In one case Braniff and Eastern flight were approaching San Antonio at about the same time when the weather went below radio range approach minimums. Eastern had to return to Houston while Braniff made an ILS approach and landed on schedule at San Antonio.**

► Senate War Investigating Committee, which was highly concerned over $21,000,000 cost of the Hughes 200 ton HK-1 plywood flying boat, is apparently unduly naive on the cost of experimental aviation. Lockheed estimates the first Constitution cost $27,000,000. Initial B-36 cost over $30,000,000 while the first two B-35 experimental Flying Wing models cost about $26,000,000 without engines, radio equipment or armament.

► **Speed gains from thermal deicing systems will probably be slight and disappointing in contrast to the 20-mph. speed boost originally claimed by United Air Lines as a result of hot wing deicing tests on a Douglas DC-6. Test project set up by Douglas to check the United reports confirmed speed increase when thermal deicing system was turned on but indicated it would not exceed one to two mph. Douglas will continue project until the increase is completely evaluated.**

► AAF is working on a plan to divorce all military air traffic in the Washington area from CAA traffic control and handle it with new radar traffic control equipment now operating at Andrews Field. AAF action was stimulated by a recent 4-hr. delay in the CAA instrument "stack" over Washington on a top ranking AAF general. The Andrews Field radar traffic control system—CPN-18—has been flight tested at AAF's All-Weather Flying Center, Wilmington, Ohio, where it controlled and landed 45 planes an hour without approaching a saturation point.

► **The long range—125-mi.— search radar installed last march at Washington National Airport is still used only by AAF. CAA, which announced it would use the set to monitor traffic in the Washington area, has not yet installed remote scopes in its airways traffic control center. Similar long range radar installed by Airborne Instruments Laboratory, Inc., will transmit its scope data to La Guardia Field traffic control center by microwave relay. Biggest problem in use of search radar for traffic control is positive identification of individual aircraft. AAF uses a small coded radar transmitter that makes a distinctive blip in the radar scope. Commercial aircraft are not equipped for positive radar identification.**

Defensive Air Patrols Urged By Gen. Kenney for U. S. Frontiers

Strategic Air Force commander recommends radar-equipped B-36 search missions as best aerial defense; predicts long-range fighter development.

By ALEXANDER McSURELY

An aerial coast guard, comparable in theory to surface coast guard operations, but using long range patrol planes operating several hundred miles around the boundary of the U. S. should be promptly established as a war preventive measure in the opinion of General George C. Kenney, commanding general, U. S. Air Force Strategic Air Command, Andrews Field, Md.

"A handful of very long range planes like the new B-36s could do the job with radar search equipment. Each plane could stay out on patrol two or three days at a time. Their assignment would be to detect any aerial movement toward the U. S. no matter from what quarter, and to identify it. If identity were not quickly established, the patrol would call out a mission of fast fighters from the nearest base to challenge the intruder. Surface vessels now are subject to coast guard regulation. But anybody can fly into the U. S. unchallenged, unless he happens to land at an airport which is a port of entry. The very existence of such an aerial patrol would be a strong deterrent to any other nation's schemes for attacking this country," Gen. Kenney pointed out.

Replying to a series of questions in an exclusive AVIATION WEEK interview, the SAC commander, recognized as one of the ablest air strategists in World War II, and now leader of the nation's first line shock troops of the air, gave his views on future trends in aerial war.

Gen. Kenney forecasts:

• **Early Use** of effective long-range guided missiles is not likely either against or by the U. S. It may be 20 years away, although this time could be shortened by earlier developments of more powerful propellants.

• **Pending Perfection** of such weapons far beyond their present status future air war will use the very heavy long range bomber as its principal striking weapon. Immediate successors to the present B-29 Superfortresses will be the B-50 (an improved B-29) the four-engine pusher flying wing B-35 and the six-engine B-36. Others are in development.

• **Very Long Range,** high speed fighters will provide additional protection to the bombers, beyond what their own armament can give. The fighters will have multiple crews, will be heavily armed and radar equipped. Tactical problems involved in using the new experimental parasite fighter, designed to be carried by a bomber, make the independently-operational long range fighter preferable.

Gen. George C. Kenney

The stocky, aggressive Kenney is a long-time disciple of air power, who as long ago as 1935 served as chief of training and operations of the old GHQ Air Force, predecessor of his present command, then headed by Gen. Frank M. Andrews, for whom Andrews Field is named.

▶ **Observer In France**—Kenney was U. S. Army Air Corps observer in France in 1940, where he made recommendations leading to drastic revisions of American warplane specifications for heavier armament, armor plate and self-sealing tanks. Later as MacArthur's air commander in the Pacific, he made telling use of a small air force against numerically superior enemy formations until reinforcements made possible an air offensive which played a vital part in the ultimate victory.

He considers the men in his SAC B-29 crews as better trained and more efficient than veteran wartime crews, although he admits it took a stiff program of training missions to build up his command to its present efficiency after the points system brought about discharge of many of the best AAF personnel.

▶ **Long-Distance Training**—Recent long range flights by B-29s to Europe and Tokyo are examples of the training missions. Air Force Day B-29 demonstrations, including the one-stop flight from Tokyo by seven out of eight B-29s, help to keep up the command's efficiency record. The Tokyo planes flew over the Washington Monument exactly on schedule at noon Aug. 1.

▶ **Monthly Flights**—Each month a squadron of B-29s goes to Tokyo to relieve another squadron on duty there. The long flights and experience of maintaining planes under field conditions give valuable training to the crews.

▶ **Views on Missiles**—Explaining his view on the prospect for long range missiles, Gen. Kenney points out that a major deterrent to early use of long-range rockets is the inaccurate mapping of many parts of the world. No matter how accurately a missile was directed according to best available maps for many localities, it might land miles away from the target because of map inaccuracies. If the missile was radio-controlled from a home base, the control might be over-powered by stronger radio controls near the target after the missile passed the half-way mark, and might be diverted.

But the major immediate drawback to the missile is the amount of propellant required to carry even a small explosive load for a distance of—for example—5,000 miles. It would take an apparatus at least as large as the B-36 to carry propellant and warhead on such a mission. And it would take an expenditure of billions in rocket research over a period of several years to develop even a prototype missile of such range, Gen. Kenney believes.

▶ **Escort Fighters**—Asked to expand his views on long-range escort fighters, the SAC commander pointed to the recent long-range flight of the P182 from Hawaii to New York as an example of what present-day fighters are capable of doing. Relief pilots and radar operators will be necessary for the new longer-range escort planes and they will be designed for speed and range primarily, rather than maneuverability as a fighter characteristic insignificant as compared to speed and range.

Gen. Kenney is doubtful of the value of the projected tiny parasite fighters because of difficulties of retrieving the planes after their small amount of fuel is used. If combat continues, the bomber which slows down to "latch on" to a spent fighter, is in jeopardy; it would be difficult for a fighter pilot to find the "mother" plane which he had originally left, and if he hooked on to another, he would be taking the place of another parasite.

The SAC chief expects centralization and elimination of overlapping and duplicating functions made possible by unification of the armed forces, will payoff eventually in better national defense at a more efficient operating cost.

Like other air force leaders he is not happy about drastic peace-time curtailments in funds available for the U. S. Operational Air Force in being, and the dim prospects for future new plane development funds.

▶ **Squadrons Ready**—His existing fighting force is on operational status. In other words, he could have his full complement of B-29s, the heavy bomber striking force, in the air on a combat mission, within a maximum of four hours, allowing only time for fuelling and arming the planes.

Merged Dutch Plants Tackle New Planes

Fokker, Aviolanda, and De Schelde in government sponsored combine.

AMSTERDAM—The Dutch aircraft industry has suffered heavily during the war. Fokker sustained severe bombing and looting damage. The Koolhoven works were completely destroyed. The Aviolanda (Papendrecht) and the aircraft department of De Schelde Shipyards (Flushing) have remained intact.

It was logical in a small country like the Netherlands that soon after the liberation a merger of all aircraft works was contemplated. Koolhoven decided not to rebuild. De Schelde, with a view to the coming merger, likewise decided to stop aircraft production, though bringing its equipment in the new combine. Fokker, Aviolanda and De Schelde concluded a merger into the "United Dutch Aircraft Factories Fokker."

▶ **Government Sponsored**—The government sponsored the merger. In fact, the government made merger a condition for financial help and participation, also with a view to stimulating the rebirth of a powerful aircraft industry by means of development orders for new types.

The merger has been operative since Jan. 1, 1947, though the articles of association are still being worked out and the capital has not yet been fixed. It is a foregone conclusion that government participation will be a minority interest. A new up-to-date combined factory situated near an aerodrome has been planned and its location will soon be determined.

The program of the merger and the new large factory is to build aircraft of own design and under foreign license. For the present, production is concentrated in the rebuilt Fokker factories at Amsterdam, the small Aviolanda works confining themselves for the time being to the construction of buses and the repair of naval aircraft.

Fokker has been fortunate in being able to acquire soon after liberation new tools and machinery from Switzerland, U. S. and Czechoslovakia and is again actively at work with approximately 2,000 mostly skilled workers.

At the moment Fokker is producing several planes of their own design.

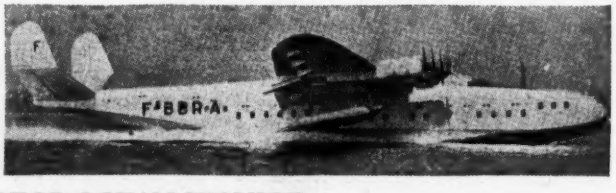
▶ **Conversions Important**—Conversions form another important part of the present program. They include all kinds of aircraft, especially Dakotas and Skymasters. Fokker has won a reputation in this respect for solid and efficient work and in particular for speedy delivery. Orders are coming in not only from the KLM but from many countries including Yugoslavia, Finland, France, Portugal, Gr. Britain, Belgium, Sweden and Norway. Owing to a foreign exchange grant Fokker is in a position to deliver spare parts with the converted aircraft, a great advantage to clients.

Maintenance, overhaul and repair naturally constitute another portion of daily routine work, especially of "Harvards," "Hudsons," "Fireflys," "Airspeeds" and "Oxfords" of the Dutch army and navy airforces.

To conclude: the intended technical (and partly financial) combine between Fokker and the American Beech Aircraft has been shelved. Factors of practicability have apparently developed, putting a spoke in the wheel of the negotiations. This is to be regretted, because it would be a great advantage for an American aircraft factory to have a pied a terre in a quiet and stable country like Holland, while the Dutch aircraft industry would have benefited by American experience.

AIRBORNE SERVICING

Seeking to get additional range with existing aircraft, British have resumed refueling-in-air experiments. By use of this technique, a converted Lancaster bomber recently flew nonstop from London to Bermuda, taking aboard 3,400 gals. of gas in flight. Photo shows a practice refueling operation before the Bermuda flight.



FRENCH FLYING BOAT FOR OCEAN SERVICE

Designed in 1938, Latecoere 631 is only now proving out. Construction of prototype was halted by war, and designs and parts were hidden from Germans. Work was resumed after liberation and four have now been completed. Photos show Number Four at recent demonstrations in England. Powered by six Wright R-2600 engines each developing 1,600 hp. at takeoff, boat cruises at about 185 mph. Span is 188 ft., length 142 ft., gross weight 157,300 lb. and weight empty 71,280 lb. Wing floats retract into outboard engine nacelles. Of a total of ten 631s to be built, Air France will put three into South Atlantic servcie. In long-range version, it will accomodate 46 passengers. Up to 100 may be carried for a range of about 1,000 mi. (Aeroplane photos)

Army-Navy Research Will Probe Supersonic Sickness

Volunteer airmen subjected to jet engine noise at experimental station; Wright Field has ambitious project

Possible effects on aircraft workers of the high-frequency vibrations enamating from jet engines may still be determined by research although the manufacturing industry turned down a proposal for such an investigation at its recent west coast meeting. Both the Army and the Navy have separate programs which may supply answers to many of the questions puzzling West Coast engineers in particular.

At the Naval Air Experimental Station, Philadelphia, the experiments take the form of subjecting nine volunteers to the noise of a jet engine in a test cell, with medical examinations following as they leave the cell.

▶ **Wright Field Project**—At Wright Field, the Air Force is undertaking a seemingly more ambitious project with the construction of an ultrasonic chamber, expected to be ready the end of this month. Here the effect of humans of vibrations up to 200,000 cycles per second will be tested.

Possibility that high-frequency vibrations above the range of audible sound (20,000 cycles per second) were injurious to health was noted during the war by the Germans in their jet engine work. Later, both the Army and Navy studied the matter. Last spring a mention of "supersonic sickness" came from employees of Britain's De Havilland Company. AVIATION WEEK, July 14, reported that the ailment was believed to have been manifested in at least one west coast company.

▶ **Temporary Deafness**—So far, it seems definite that the supersonic vibrations will produce temporary deafness. Other impairments are only suspected. It is known that high frequency vibrations from a jet engine will homogenize milk, break down the chemical components of mercury, and sterilize bacteria. Tests with animals and humans have shown that the vibrations affects pulse rate and blood pressure. Whether they can cause hysteria, nervous disorders and nausea —as has been alleged—may be determined by the Wright Field experiments.

According to Dr. Horace O. Parrack, research physiologist at Wright Field's Aero Medical Laboratory, single frequencies will be tested at a time to find out whether high or low frequency vibrations, singly or in groups, have the most harmful effects.

The equipment is mounted in a 20 by 30 ft. basement room at the laboratory. Inside the room is another wooden room about 15 by 20 ft. This is soundproof and "anechoic," or non-echoing.

A 250 hp. electric engine turns up an aircraft-type supercharger which compresses air. The air drives the rotors in a siren, about 4 ft. in diameter, which sets up the vibration in the small room.

The "horror chamber" will be ready for its first test about the end of this month, with Dr. Parrack probably being the first "victim." "Sort of an unwritten law, you know, that we scientists try out the things we perfect," he says.

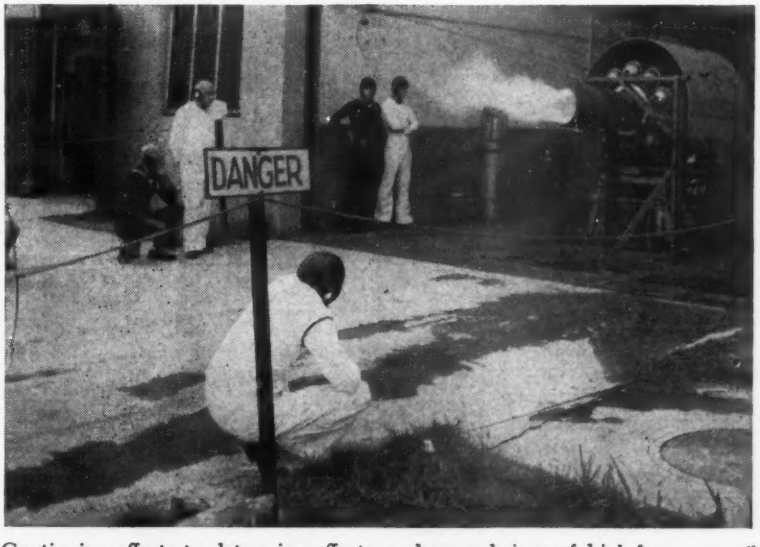
Throughout the range of audible sound the whirring rotors will quite literally be capable of reducing a person to a state of frenzy under prolonged subjection. The bearable level of noise, about 130 decibels, can be surpassed by this machine.

Past the audible range the machine will lapse into silence except for the background of motor hum—and what the effect will be of these ultra-high frequency silent vibrations remains to be discovered.

As this research is concerned with the whole general range of sound, Dr. Parrack intends to reproduce noises from aerodynamic vibrations of a plane to generator noise and simple rattles.

Aiding the AAF physiologist in the project have been 4 or 5 German scientists. The Germans were making considerable studies in the field of sound when the war came to an end.

The Army believes this is the most advanced sound chamber ever constructed. It is complete with various analyzer instruments including a frequency counter, which is like the panadapters used for indicating radio waves.



Continuing efforts to determine effects on human beings of high-frequency vibrations emitted by jet engines (AVIATION WEEK, July 14), Naval Air Experimental Station at Philadelphia has started tests with nine enlisted men who volunteered. With special helmets protecting their eardrums from blast effect of noise, men remain near the engine for an hour. They then are examined by doctors as they leave test cell. While temporary deafness has been attributed to noise of jet engines, extent to which vibrations affect nervous system has not been decided. (INP photos)

Sunderland Resigns As Edo Sales Chief

Frank Sunderland, advertising and sales promotion manager of Edo Aircraft Corp., has resigned effective Sept. 1. He has not yet announced his future business plans.

He took over the Edo job two years ago and directed the promotional program that assisted in pushing last year's sales to six times the prewar volume. Current sales are ten times as high as prewar.

In other personnel actions:

• **McCullough Motors Corp.,** Los Angeles, appointed C. F. Breer sales manager. He has been assistant sales manager.

• **Air Associates, Inc.** shifted Willard Walpole, Dallas branch manager, to Los Angeles as manager of that branch. Jack E. Beane, now in Seattle, moves to Los Angeles as sales manager of the LA branch's manufacturing division. Replacing him in Seattle will be John Morrow, now in the LA branch. Norman Bjornsen has been named purchasing agent for the Teterboro division. He formerly was buyer for the manufacturing division.

• **B. F. Goodrich Co.** appointed Willard C. Gulick president of international B. F. Goodrich Co., succeeding Stanley W. Caywood, retired. He formerly was general sales manager of the export division.

• **General Electric Co.** announced the retirement of Waverly A. Reeves of the Aircraft Gas Turbine Engineering division. Associated with GE since 1904, Reeves assisted the late Dr. Sanford Moss in developing the first aircraft turbo-supercharger.

• **Aircraft Screw Products Co.** elected Alfred Marchev to the board of directors. He formerly was president and chairman of the board of Republic Aviation Corp.

• **Nylok Nut Corp.,** New York City, appointed Lee N. Brutus Pacific Coast sales representative. He formerly was executive vice-president of Waco Aircraft Corp. and president of Luscombe when it was at Trenton.

• **Solar Aircraft Co.** appointed Joseph E. Padgett director of Manufacturing at San Diego, and Leon T. Noel budget director. New members of the board are: Charles T. Leigh, a vice-president of Consolidated Vultee, and Edward W. Goodwin, San Diego realtor.

Lockheed to Modify 50 Shooting Stars

Lockheed Aircraft Corp. has received a $7,500,000 contract for the modernization of 508 P-80 fighters, the largest order of this kind the company has received since the end of the war. Changes will give the A model some of the features of the P-80B, current production model.

Among the items to be added to the planes are: water-alcohol fuel injection, provision for jato take off, modified wing tips, rocket launchers, cockpit cooling and canopy defrosting.

Modernization of the planes will attain a rate of five a day in November, with the schedule calling for completion of the contract in March. All P-80As in the U. S. are included in the program, with 52 conversion kits to be prepared for P-80s overseas.

Briefing Production News

► **Consolidated Vultee Aircraft Corp.** has sold six Convair Liners to Sabena, Belgian National Airline, for about $2,000,000, with deliveries scheduled to begin in Feb., 1948. Company now has orders for 171 Convair Liners.

► **Fairchild Engine & Airplane Corp.'s** personal planes division is now completely established at Strother Field, Winfield, Kan., and is in production of spare parts for the F-24, four-place personal plane, and other Fairchild civil models.

► **Minneapolis-Honeywell Regulator Co.** has delivered the first unit of a $2,000,000 Air Force order for E-6 electronic autopilot control systems which will be installed on B-36 and B-50 bombers.

► **United Aircraft Corp.** has paid nearly $7,000,000 to employees under terms of group insurance policies since the inception of the first plan in 1928.

► **Lockheed Aircraft Service, Inc.** is now offering maintenance and overhaul service at its MacArthur Field, L. I. base for corporation-owned executive type aircraft.

► **Lockheed Aircraft Corp.,** effective Jan. 1, will extend its group insurance plan to provide coverage for an employee's entire family. Company will pay a share of the premium only for the employee.

► **Boeing Aircraft Co.** next week will sponsor a three-day symposium on high altitude flight for U. S. and foreign air lines, for government, manufacturing and technical society representatives. Boeing, which for five years has carried on a major portion of AAF's high-altitude research, plans the symposium as an exchange of information and experience on design and operation of pressurized aircraft.

► **Chicago Metal Hose Corp.,** Maywood, Ill., has received CAA certification for two types of Rex-Flex metal hose for use as fuel, oil, instrument and vacuum lines in aircraft.

► **Lamson and Sessions Co.,** Cleveland bolt and screw manufacturer, reports labor turnover as the lowest in its 70-odd year history and employment now at the same level as a year ago.

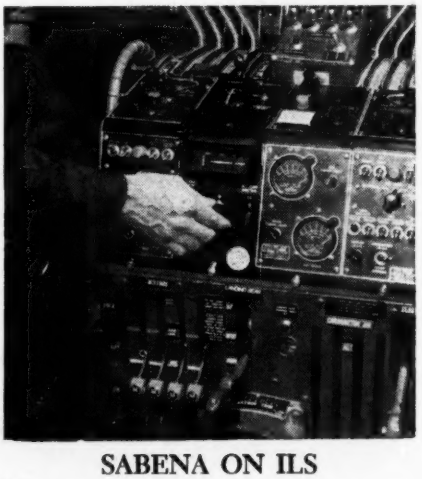
Pacific Airmotive Sets Up 10th Base

The tenth base in Pacific Airmotive Corp.'s continent-spanning chain of maintenance, repair and supply facilities has been established at Linden, New Jersey, eight miles from Newark, in the plant used during the war by Eastern Aircraft Division of General Motors.

Under direction of Gunnar Edenquist, vice-president of PAC, the Linden Base already is doing work for Pan American Airways, Colonial Air Lines, Trans-Caribbean Air Cargo Lines, Scandinavian Airlines System, and others, they are expected to make a strong bid for executive plane business.

One of PAC's main services at Linden, as it is at other branches, will be engine overhaul. Of 90,000 sq. ft. of space, 60,000 is occupied by the engine and accessory shop. Edenquist said overhaul of an engine a day will be achieved in the near future. For some time, PAC has had a fixed-price engine exchange plan.

Linden will also be eastern headquarters for PAC in its role as distributor of aviation goods. The company claims that more than 500,000 aviation items will be stocked, available to fixed base operators franchised as PAC dealers.

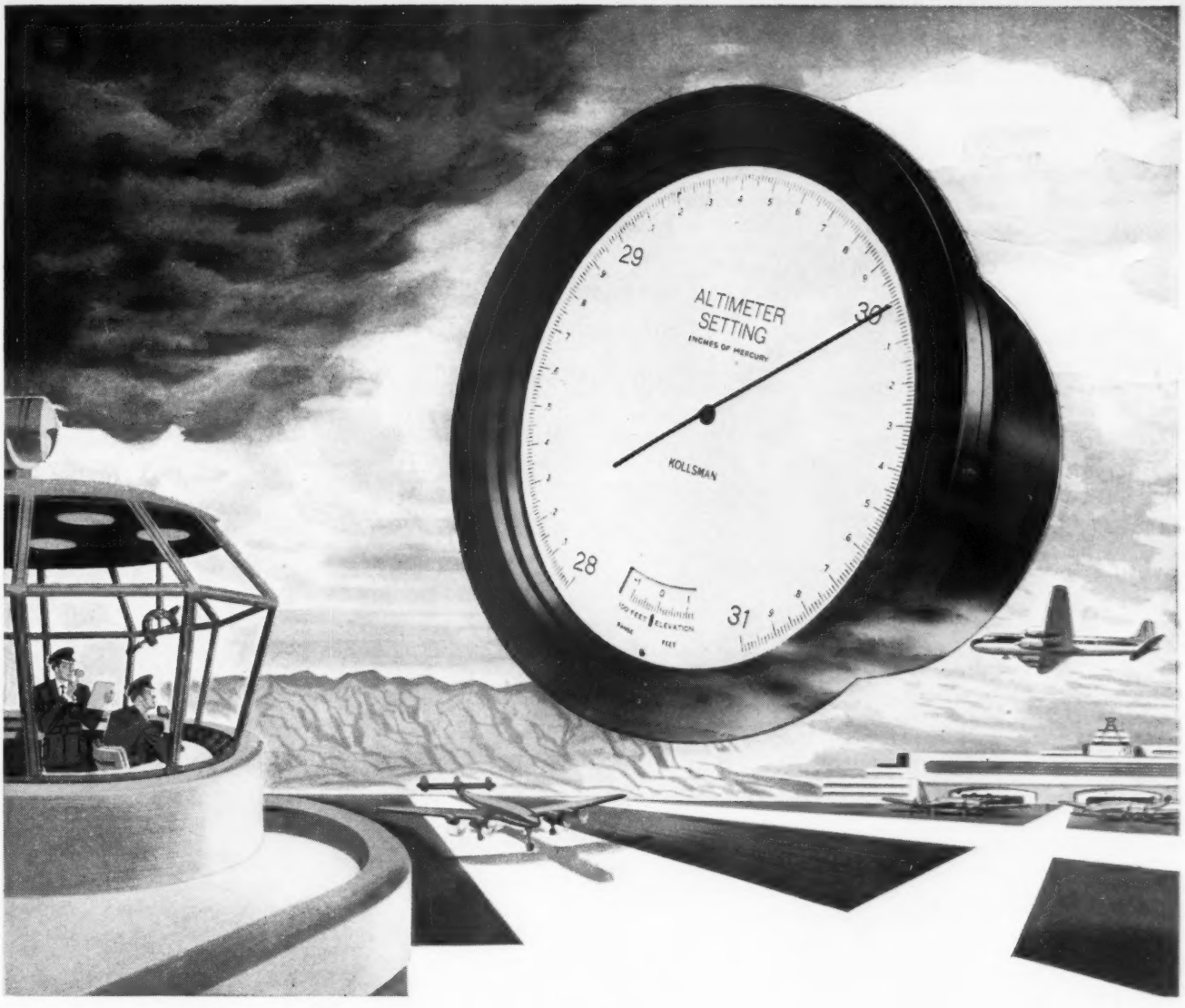


SABENA ON ILS

First commercial transport in Europe capable of making automatic airport approaches on ILS is the Sabena DC-6 currently touring European and African air routes. The Belgian ship—first DC-6 to fly the Atlantic—is equipped with the Sperry A-12 Gyropilot and Automatic Approach Control, as shown.

Hughes Radar Used

Colonial Airlines is making a test installation of Hughes obstacle warning radar equipment in one of its DC-3s and is expected to equip its entire fleet with this or a similar radar device.



Another step towards greater airline safety

The new Kollsman Altimeter Setting Indicator for airway control stations provides a direct, continuous, accurate indication of the altimeter setting for broadcast to the aircraft. By eliminating potential sources of error and delay present in existing methods, the Altimeter Setting Indicator offers another step towards greater airline safety. By its greater accuracy it also makes possible more accurate indication by the altimeters in the aircraft — an important consideration in steps towards all-weather flight.

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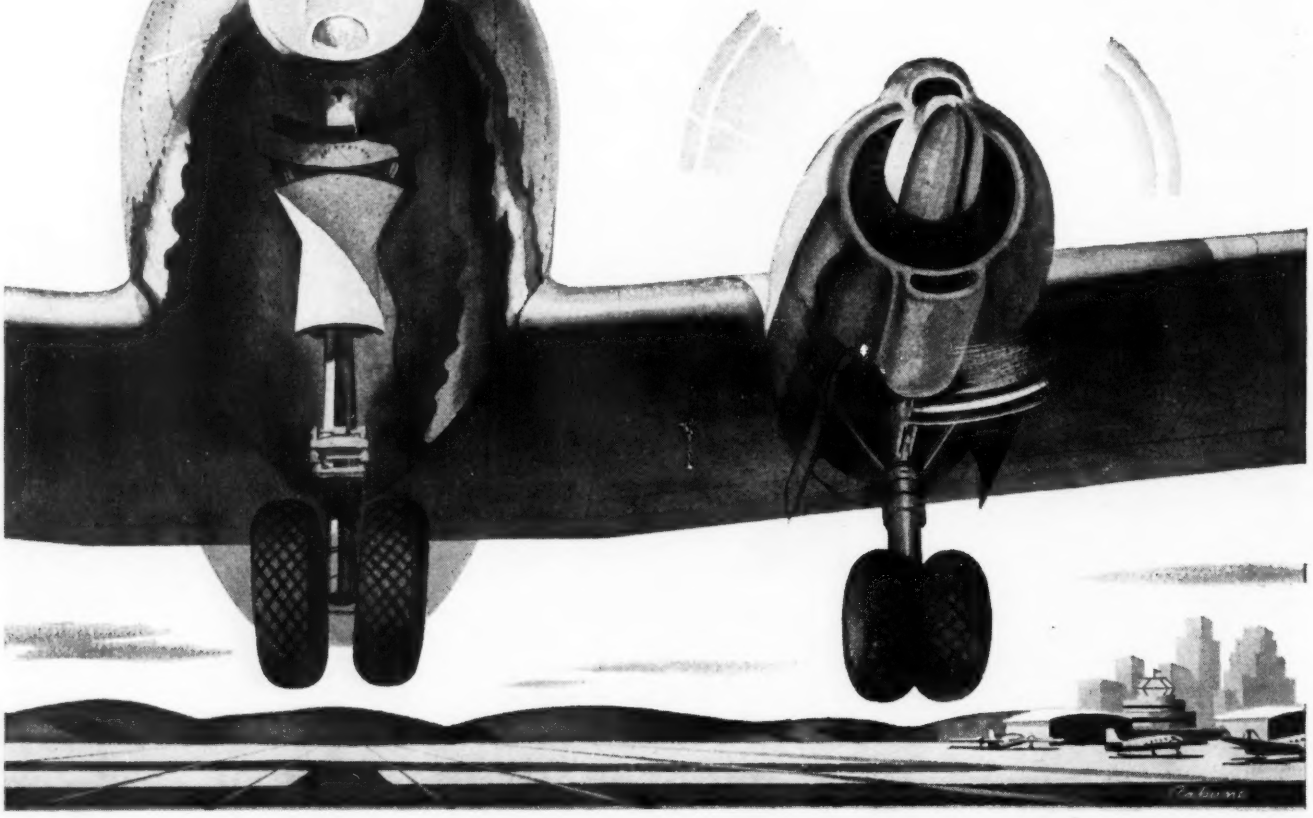

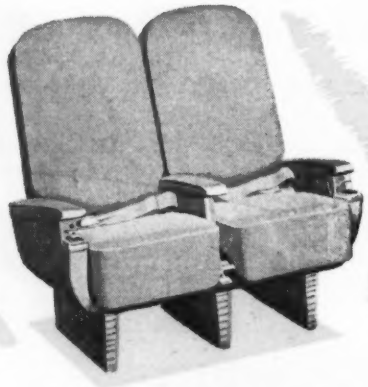

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Design Changes In J-33 Turbojet

Development program of Allison since AAF assigned engineering responsibility brings alterations resulting in higher thrust, longer life, lower weight.

By JOHN FOSTER, JR.

Boosting thrust by more than 40% and engine life by 300% while cutting weight by more than 7% and materially reducing cost in less than 2 yr. is the record of Allison Div. of General Motors Corp. in producing J-33 type turbo jet engines. (For complete Design Analysis of the basic engine, see AVIATION, Jan., 1946)

These improvements have been achieved by redesign of individual components and changes in production techniques started when engineering responsibility was transferred to Allison from General Electric, original J-33 designers, who had been directed by the AAF to concentrate on the design of J-35s.

Important design and production changes have been made throughout the entire engine, now designated by Allison as the model 400. The compressor rotor, for example, is becoming a completely new unit, with half the original number of vanes, yet capable of handling 20% more airflow with 10% higher efficiency.

This new rotor is a 3-piece unit comprising a central forged impeller and two inducers, machined from smaller individual forgings, and bolted to each face of the impeller. Performance, production, and maintenance advantages are gained from this design, in addition to a major weight saving.

By setting up the inducers as separate units, it is possible to get a more gradual turning of the air, with a resultant higher efficiency. By using a thinner forging for the central portion it is possible to maintain better quality control and thus not only get more uniform products, but reduce costs in rejected material and in overall machining time. By having the inducer blades separate, damage to one blade does not mean a complete compressor rotor must be discarded, thus reducing spare parts inventories.

At the same time lowering the number of blades has effected a 26-lb. weight saving, with still more to be gained by changing from aluminum alloy to magnesium.

▶ **Diffuser Changed**—A major change in diffuser design facilitates the production of a better component aerodynamically. The new design is two-piece construction, replacing the old single casting. The two pieces are now machined, including vanes and turning elbows, then bolted together.

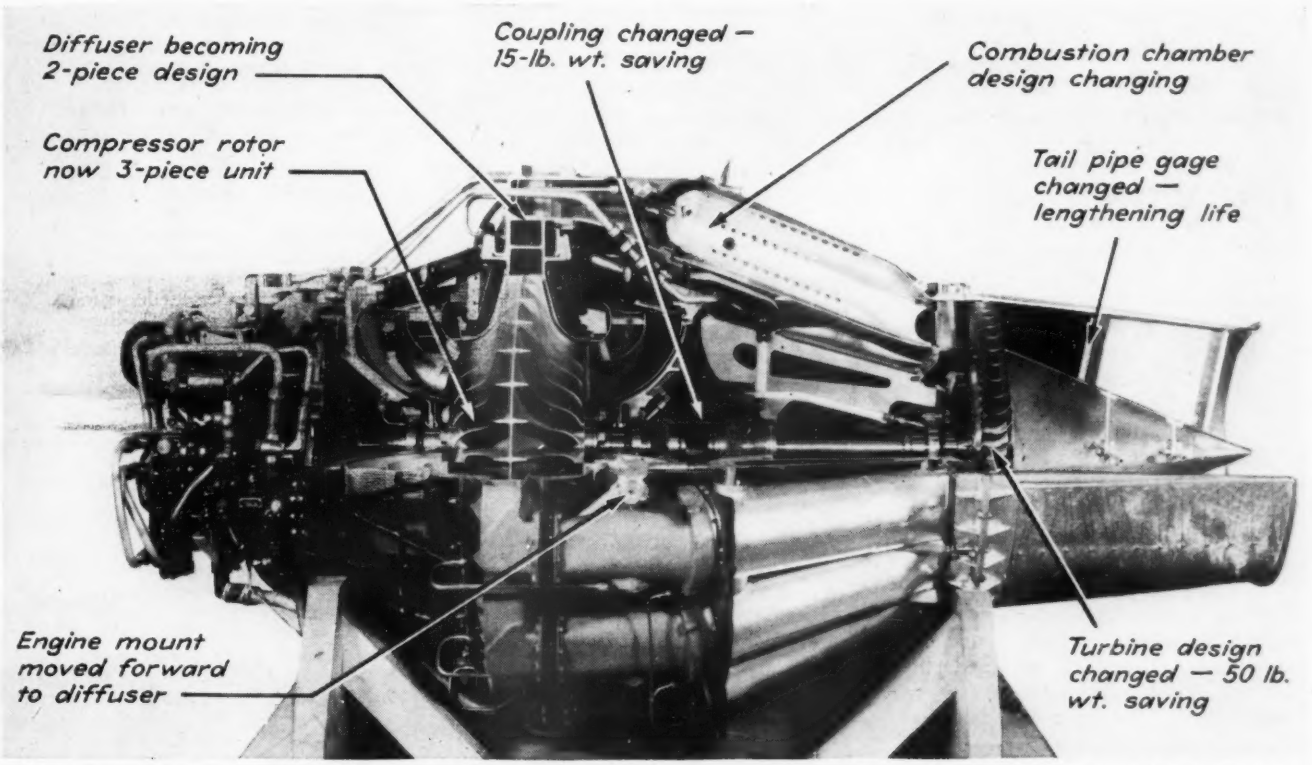
Combustion chamber design represents a constant change—which is still going on—with added efficiency and reduced pressure drop over present levels as the goal. Size, number and position of louvres and holes in the chamber liner have been and still are being changed as a result of continuing research.

Greater maintenance efficiency is resulting from a basic change in the design which calls for construction in two major subassemblies, making it possible to remove any one chamber or liner without the rather complete engine teardown necessary in early models. This change will call for close cooperation with airframe designers to insure the value will not be lost by building the plane without the necessary access panels.

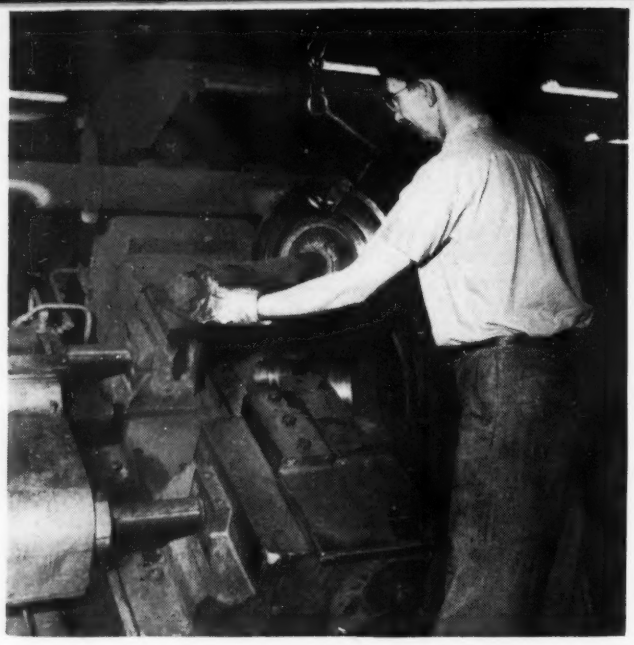
▶ **Life Lengthened**—Contrary to the general trend of weight reduction throughout the engine, current combustion chambers are heavier since Allison specified a 40% increase in thickness of both liner and chamber. This small sacrifice in weight has been compensated by a 300% increase in life; combustion chambers today are often in better condition at the end of 150 hr. of service than earlier units were at the end of 50 hr.

Similar tripling of service life has been achieved by changing the alloy of the turbine nozzle diaphragm blades, and engine efficiency raised by production changes which call for welding the nozzle diaphragm inner band only along the rear face instead of both faces. An additional change currently under way is aimed at raising both production and maintenance efficiency, for nozzle vanes and shroud rings are being made in shorter segments. This means damaged vanes can be replaced quicker and from smaller spare parts inventories.

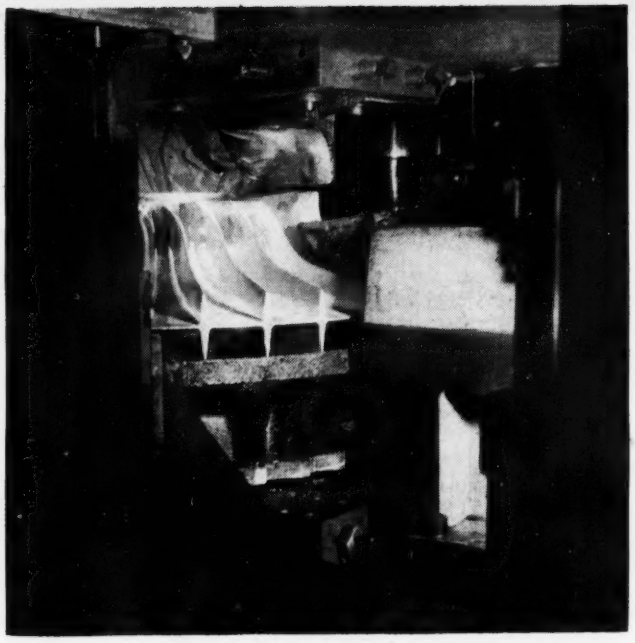
Among the most important changes are in the turbine wheel, where a net saving of 50 lb. and greatly reduced production costs have been achieved. Most of the weight saving has been effected by taking off nearly


Diffuser becoming 2-piece design
Coupling changed — 15-lb. wt. saving
Combustion chamber design changing
Compressor rotor now 3-piece unit
Tail pipe gage changed — lengthening life
Engine mount moved forward to diffuser
Turbine design changed — 50 lb. wt. saving

DESIGN DEVELOPMENT: Typical of design and production changes made in J-33 engine by Allison Div., General Motors, since engineering responsibility was assigned by AAF. Result: lower weight, increased thrust and life.



PRODUCTION SPEEDER: Massive butt welding machine attaches turbine wheel to main shaft in process aimed at higher output rate with better quality control. Some 60,000 amp. go through shaft and wheel, which are of different alloys.



BLADE SHAPER: Instead of laboriously machining curvature into impeller blades, only fairly simple machining is done on vertical plane. Then, with impeller brought to high heat, it is placed in this 40-ton hydraulic press and blade shape is imparted by dies.

½ in. from the rim on each face of the turbine wheel, with comparably shorter blade roots. By thus thinning the wheel it has been possible to exercise more control over the forgings.

Production cost cuts have been made possible by pinning the blade roots in place instead of the original peening process which required a groove along the rim. Under current practice a small hole is drilled through what little rim is left into the serrations that retain the blade root. Each root, in turn, has a small radial slot to match the hole in the wheel. With the blade in place the pin is driven through the hole and hammered hard enough to bend it into the slot. Removal of the blade can be done by simply shearing the pin.

The pinning process has been found faster than peening, has cured blade shifting and simplifies turbine balancing. This latter process has also been speeded by moment balancing all blades on a shop-devised scale. As each blade is moment-weighed it is marked and stored according to its classification, so that when the turbine is assembled the blades are already well matched.

On the splined turbine-compressor coupling Allison engineers have reduced weight by 15 lb. and cut production costs by eliminating the double shoulder on each end.

Some of the slight weight increases have been more than counterbalanced by a 10 to 15 lb. saving brought about by simply eliminating the 14 tie straps which originally ran between combustion chambers from the bearing support assembly to the flange uniting the nozzle diaphragm and tail cone.

► **Additional Weight Savings**—An additional 30-lb. weight saving and elimination of two expensive forgings are made possible by moving the main engine mount attaching points forward 9½ in. from the aft truss ring to a face being built into the diffuser.

Unlike most weight-saving changes made in reciprocating engines—which put parts under greater stress—the model 400 alterations have resulted in a more efficient engine with increased reliability and service life. Specific fuel consumption has been reduced from 1.20 to 1.12 and production engines today are built to pass a 150-hr. type test which may soon be increased. Dry thrust has been raised from a guaranteed 3,750 lb. to an Army-announced 4,600 lb. Since water-alcohol injection is known to boost power ratings by 20-25% the take off ratings of the model 400 can be assumed to be well over 5,000 lb., with 6,000 lb. within the realm of possibility before the series is completed.

Typical Changes Made in J-33 Design Development

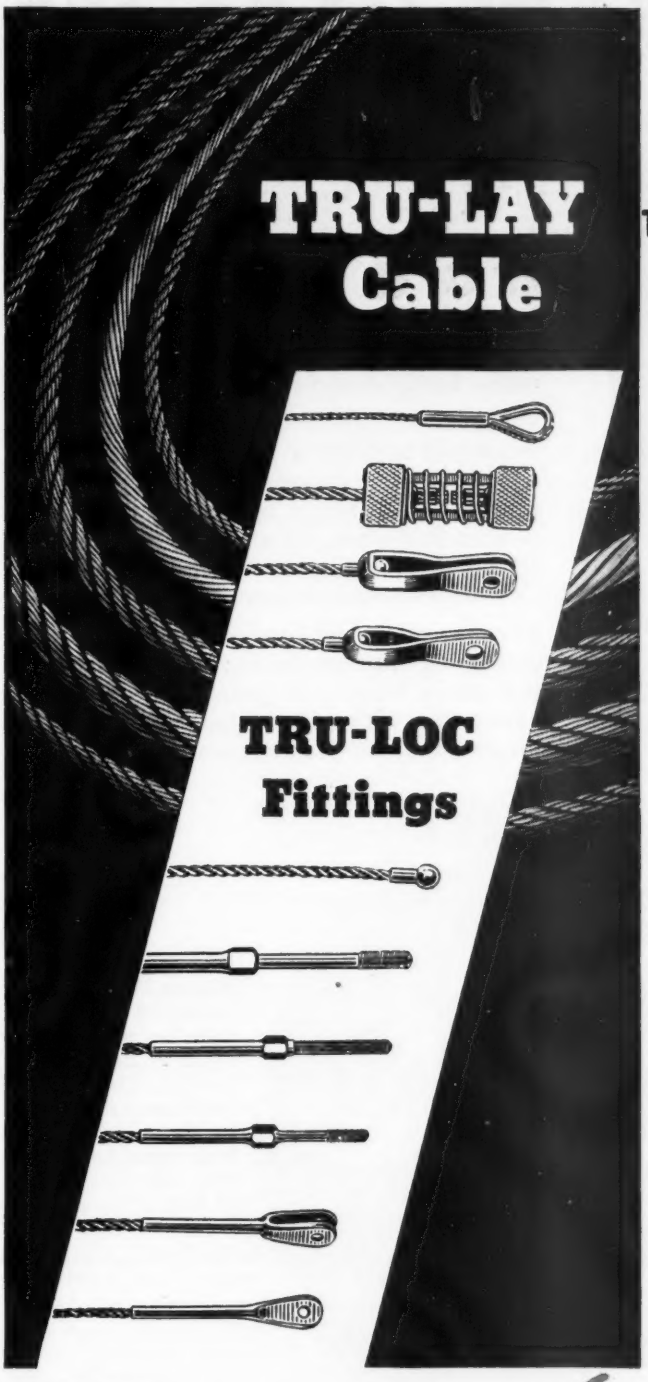
Changes in J-33-17 from J-33-9 engine

1. Dzus fasteners provided on air sector assemblies. Facilitates installation & removal.
2. Igniter plug sleeve ID. increased to eliminate spark jumping.
3. Igniter plug mounting holes offset to insure upstream air circulation in plug.
4. Governor was completely redesigned.
   a. Gov. weight system changed from spring type to flyball type for increased reliability.
   b. New weight system required an oiling system.
   c. Pilot valve more positively controlled.
   d. Higher hardness on wearing parts.
5. Barometric was redesigned.
   a. Control valve bushing redesigned.
   b. Lower bellows attachment redesigned.
   c. "O" sealing instead of gaskets.
   d. Bellows headers changed to steel.
   e. Button & plunger on control valve redesigned.
6. Single lever control valve and support added to basic engine.
7. Diffuser, front & rear truss rings changed from aluminum to magnesium.
8. Compressor rotor changed to provide better balancing facilities.
9. Stub shafts now provide flush fit to compressor impeller face.
10. Accessories gear case now includes hydraulic pump drive.
11. Turbine bearing supports changed from aluminum to magnesium.
12. Inner liner stock thickness increased to eliminate cracking. Radial support ribs and clips eliminated to prevent warpage. Extension added to transition end to enhance cooling of ring & tube assembly.
13. Inner crossover tube changed to "swastika" design to increase endurance life.
14. Expansion joint on outer exhaust cone front flange. Reduces warpage.
15. Dome assys. contain "T" type dome brackets and facilities to support liner.
16. All flexible piping.

Changes in J-33-21 from J-33-17 engine.

1. Air adapters changed from aluminum to magnesium.
2. Water-alcohol injection added.
3. Shielded ignition added.
4. Generator oil pump changed to gear type.
5. Eliminated tie straps.
6. Bellows type outer crossover tube added.
7. Two-piece tail cone blanket added.
8. Cut back guide blade assys. to enhance H_2O inject.
9. Revised nozzle diaphragm. Construction, reducing distortion.
10. Anodize accessory housing shafts to eliminate fretting and corrosion.
11. Changed from peened turbine blade fastening to pinning.

THEY MUST BE TOP QUALITY OR THEY MUST BE SCRAPPED



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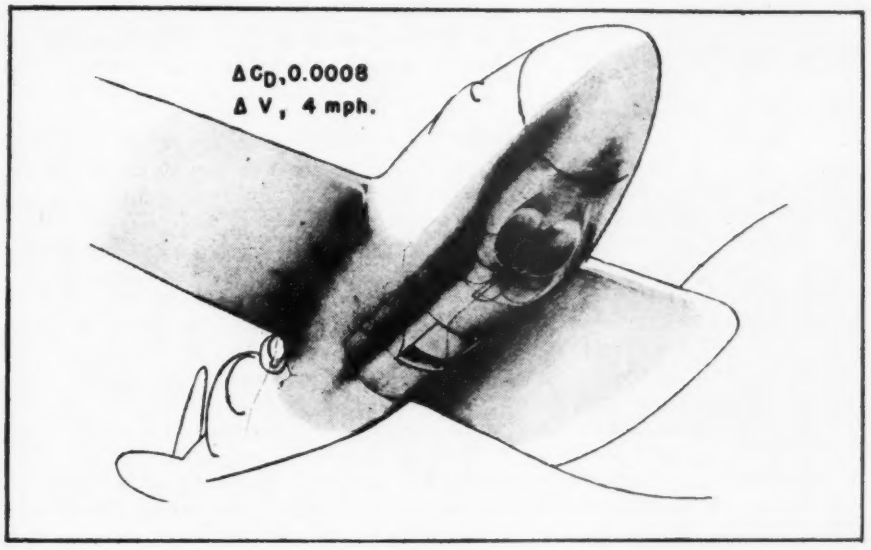
Searching Drag Studies Check Speed Impeders

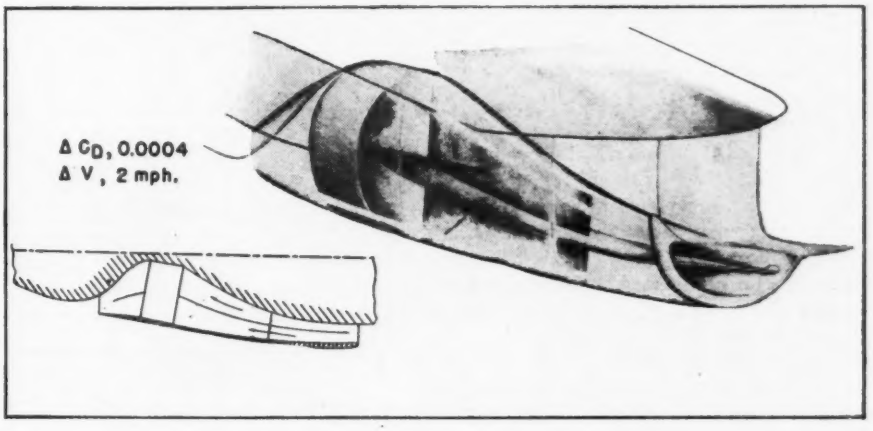
Part IV

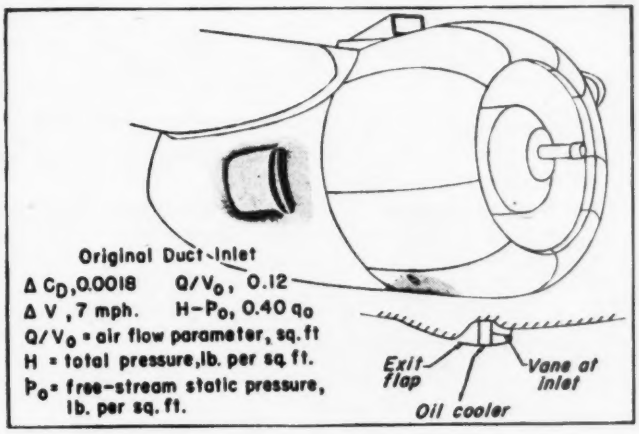
Detailed here are three more ducting modifications primarily intended to boost total-pressure recovery—angular placement of oil cooler air-inlet plane, vane installation to reduce boundary layer separation, and duct relocation. (Other ducting studies appeared on page 29 of July 28 issue of Aviation Week.)



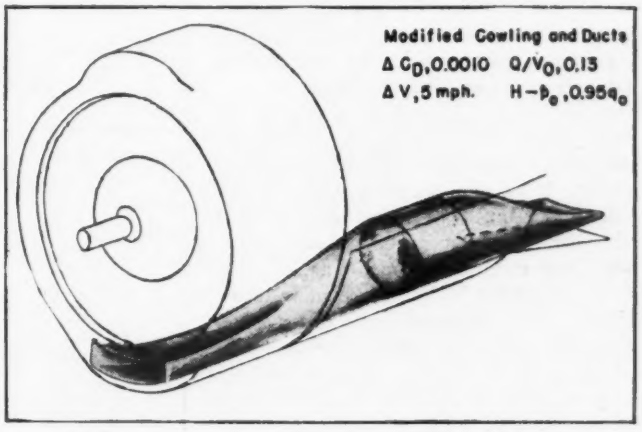
OIL-COOLER AIR INLET on this craft was set at such high oblique angle to direction of airstream that flow tended to overrun inlet. For airplane in high speed attitude, average total-pressure recovery at face of oil coolers was only $0.33q_o$ (q_o is free stream dynamic pressure, lb. per sq. ft.). Extending the lower lip of inlet forward so that plane of inlet would be more nearly normal to local airflow should result in recovery of most of available total pressure. Increment of drag coefficient shown in illustration is difference in drag of plane with both inlets and outlets sealed and unsealed.

VANES WERE INSTALLED in rear underslung duct of this installation to reduce pressure losses at radiator face as result of separation caused by thick boundary layer at inlet. Drag coefficient was 0.0004 less with guide vanes installed in diffuser and inlet than without vanes. Also, pressure recovery at radiator face was increased, by vane installation, from $0.69q_o$ to $0.83q_o$ at α_T (angle of attack of thrust axis) = 0.2 deg., and from $0.84q_o$ to $0.92q_o$ at $\alpha_T = 10.4$ deg.




Original Duct-Inlet
ΔCD,0.0018 Q/V0, 0.12
ΔV, 7 mph. H−P0, 0.40 q0
Q/V0 = air flow parameter, sq. ft
H = total pressure, lb. per sq. ft.
P0 = free-stream static pressure, lb. per sq. ft.
Exit flap
Vane at inlet
Oil cooler

TOTAL-PRESSURE RECOVERY measured at face of oil cooler of this airplane (left) for high-speed condition was only $0.40q_o$. Low recovery was attributed to thick boundary layer at duct inlet. Drag resulting from ducts on both nacelles with outlets open for high-speed condition was 0.0018 greater than with ducts removed.



Full-scale tunnel modification to improve this installation is shown in illustration at right, for which new oil-cooler duct was constructed having inlet flush with face of cowling, and gradually expanding diffuser. Result—total-pressure recovery at face of oil cooler increased to $0.95q_o$, drag coefficient reduced by 0.0008.

Turbojet "Yardsticks" Checked In Flying Lab Tests

Four controlling studies are detailed in this analysis of prove-out procedures for jet designs.

By W. O. MECKLEY, *Aircraft Gas Turbine Div., General Electric Co.*

Vital phases of a **flying laboratory test** program to evaluate **a turbojet development** are investigation **of windmilling characteristics**, thrust **potentials, and burner blowout** action. And **instrumentation is a** basic consideration. General **flying test** considerations were discussed in AVIATION WEEK, Aug. 11, pages 28 and 29.

Windmilling characterisitcs of a turbojet are important in their effects on altitude starting and drag imposed on the airplane. Test experience shows that windmilling speed of an axial flow turbojet is considerably higher than the centrifugal type (Fig. 1). It is desirable to obtain windmilling speed under different flight speeds, as, for example, in the case of one axial flow design, in which speed was sufficiently high so that operation of the starter was not necessary under all altitude starting conditions.

From Fig. 1, it may be observed that windmilling speeds are essentially independent of altitude, varying almost linearly with true airspeed of the plane.

Measurements should also be made of the drag imparted to the craft to determine whether shut-off valves need be installed at the engine intake air duct to keep this drag within reasonable values in the case of a multi-engine plane, or in an installation where the turbojet is used as an assist power plant which is shut off at times to reduce power. In most tests thus far, the drag of windmilling turbojets has been high, indicating the need for shut-off valves at the intake air duct when the engine is inoperative.

▶ **Instrumentation**—Recording of flight test data must be free of human error, and is usually accomplished by synchronized mechanical means—photo and/or chart recording in the space provided for instrumentation. Even under ideal conditions of comfort and space, as found in a wind tunnel test, manual data recording cannot compete with the accuracy and speed of a photo recorder. In an airplane, where working conditions are much worse, accurate analysis after the test has been run is almost impossible from manually recorded data.

In a flying test lab, photo recording allows flight and design engineers to observe and direct the test rather than be occupied with getting manual readings. If a multiplicity of photo recorders are used, all cameras must be synchronized to take pictures at the same instant, to properly correlate data.

Flight types of general service instruments generally form the backbone of an instrument set-up. Manually balanced or adjusted instruments are ruled out with mechanical recordings. All instruments are usually of the direct indicating or automatically recording type. Manometers are acceptable for pressure readings in static operation, as in a wind tunnel, but for flight work the aneroid type of pressure gage has been found most satisfactory. Pressure taps and thermocouples to record the numerous readings in a gas turbine flight test are of the conventional type.

Degree to which an engine is equipped with instrumentation to record various temperatures and pressures, depends upon the specific installation and the vehicle in which tested. For example, two extremes in instrumentation would be typified by a type 1-40 turbojet prepared for wind tunnel test, and the same engine installed in a hypothetical craft (Fig. 2). In a tunnel test engine, instrumentation is complete, while in the hypothetical craft no more than operational and overall instrumentation is employed. Two details of special interest, because of their uniqueness to this type of flight test power plant, is the determination of jet thrust and burner blow-out.

▶ **Measuring Thrust in Flight**—The installation shown in Fig. 2 is generally representative of a typical single-turbojet fighter instrumented for flight test. It is important in such an installation to determine how the thrust at takeoff and in flight compares with engine performance established in factory tests. Most practical method is to determine jet thrust and ram drag in terms of gas flow and jet velocity, from measurements of exhaust tailpipe gas pressures and temperatures, airplane speed, and ambient air pressure.

Jet thrust can be expressed as the summation of the momentum or velocity thrust and pressure thrust. Momentum thrust is the summation of the products of all the pressure unbalances on the confining walls of the exhaust system multiplied by their respective increments of area—usually evaluated as the summation of the product of mass flow times velocity for each increment of jet area. Size of these individual jet area increments—each of which is assumed to be a uniform velocity field—is fixed by the number of instruments in exhaust path.

Pressure thrust is the force resulting from pressure drop from the jet nozzle throat static pressure (p_s) to ambient pressure (p_a) over the entire exhaust system surface. Nearly all of these increments cancel out, and pressure thrust is expressed as the sum of the products of ($p_s - p_a$) times the increments of nozzle area. Summing up the quantities described above, the expression for jet thrust is:

$$F_j = [C_f A P_{si} f_1 (P_t/P_{si})] + C_f A (P_{si} - P_a)$$

where F_j is total, or jet thrust; C_f, thrust calibration factor, depending upon pipe length, etc.; A, minimum hot area of jet nozzle; P_t, jet stream total pressure; P_{si}, jet stream static pressure; P_a, discharge ambient pressure; and f_1 indicates "function of" term in parenthesis.

Gas flow can also be expressed as a function of the cross-sectional area of the exhaust pipe, static temperature, and total and static pressures in the pipe, as follows:

$$W_a = \frac{A P_{si}}{\sqrt{T_s}} (f_2 P_t/P_{si})$$

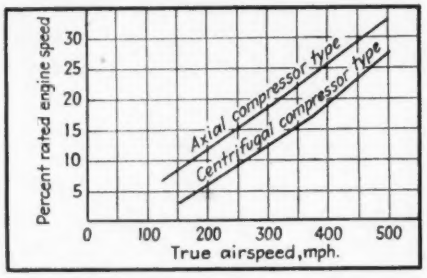


Fig. 1. Graph of engine windmilling speed vs. true airspeed—5,000 to 35,000 ft.

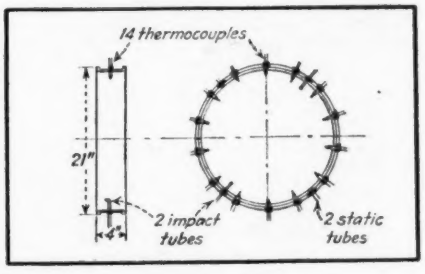


Fig. 3. Instrumented ring for jet thrust evaluation in flight.

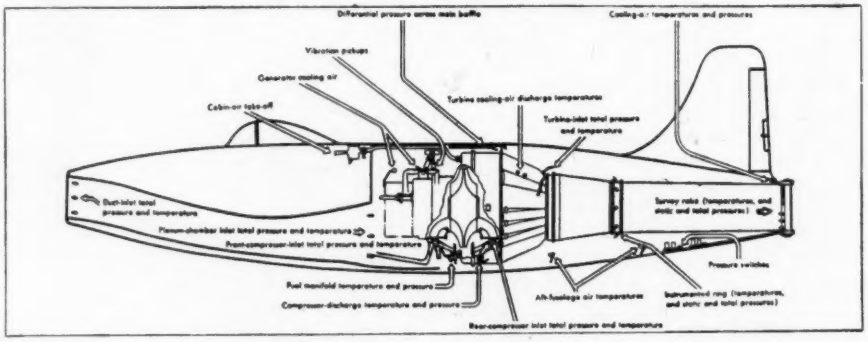


Fig. 2. Typical instrumentation in hypothetical aircraft installation.

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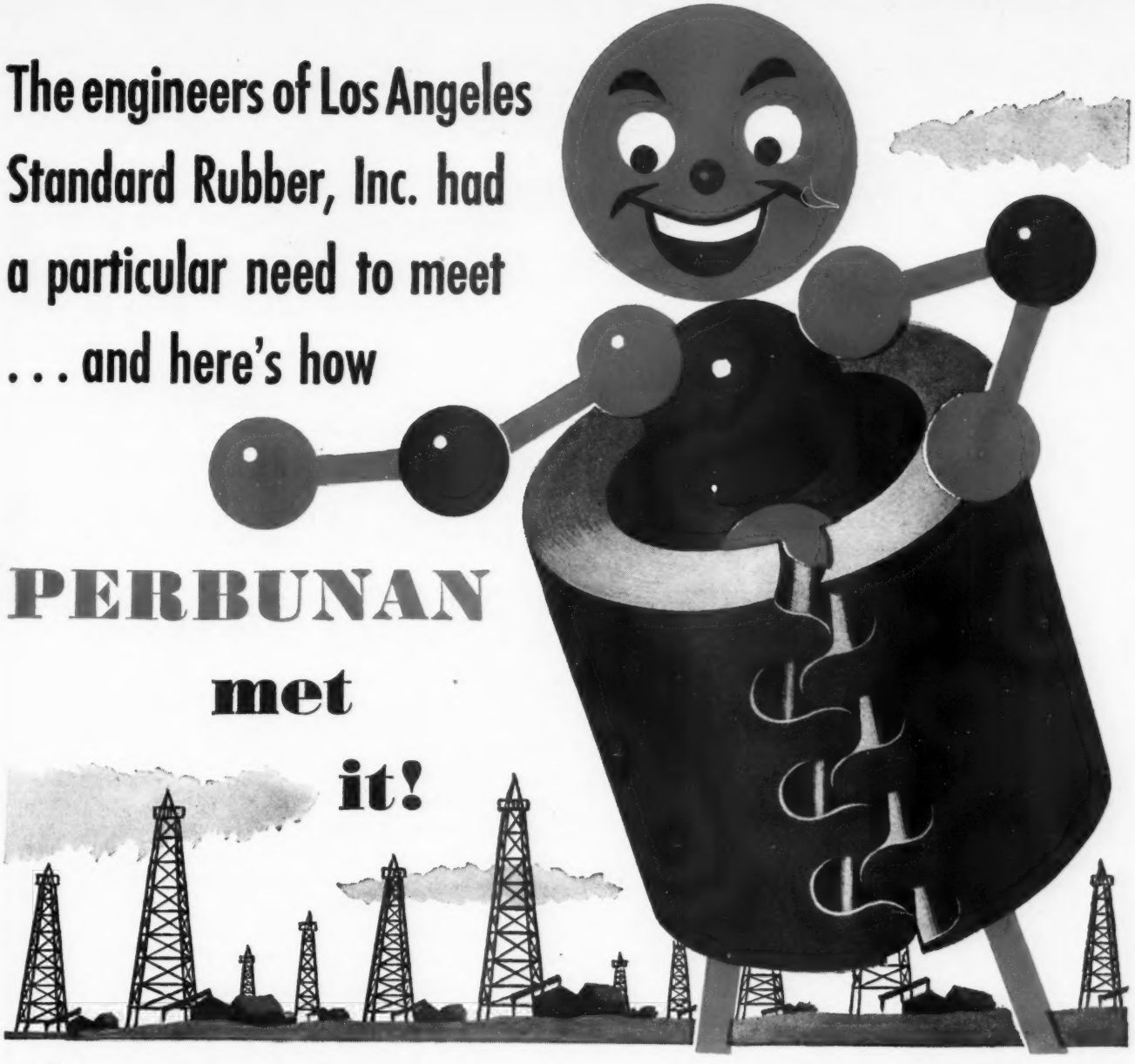

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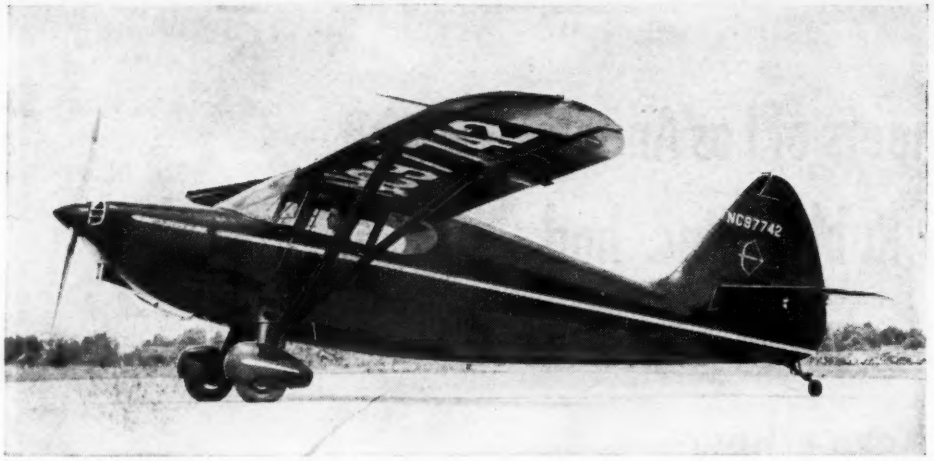

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where W_a is gas flow in lb./sec.; T_s, static gas temperature deg. R.; and f_s indicates "function of" term in parenthesis.

Uusually, it is assumed sufficiently accurate to neglect the relatively small amount of fuel added to the air, and the same mass flow as measured at the exhaust end is assumed to represent the air flow entering the engine.

Ram drag resulting from air consumed by the turbojet unit is therefore:

$$F_r = \frac{W_a}{g} V_p$$

where V_p is the plane speed in fps.

Net thrust available to the airplane for propulsion is:

$$F_n = F_j - F_r$$

There have been several methods developed for determining, with sufficient accuracy, temperatures and pressures in n exhaust pipe. In general, the number of instruments necessary or the complexity of the survey will depend upon the uniformity of the exhaust gas discharge flow pattern. Fig. 3 shows details of one device used to determine the quantities of pressure and temperature, in flight, for evaluating jet thrust. This unit is an instrumented ring consisting of 14 thermocouples, 2 impact pressure tubes, and 2 static pressure tubes.

In general it is desired to have a single thermocouple survey one burner, so that the number of thermocouples installed will depend on the number of burners in the engine. Thermocouple readings are averaged to give the "indicated" gas temperature, which has been assumed to represent static temperature plus six-tenths of the impact rise. Value of total pressure is taken as the average of the readings of the two impact tubes, and static pressure is the average of the two static pressure taps.

Fig. 4 illustrates another type of survey tool used extensively to measure thrust in jet flight where large gradients in exhaust gas discharge pressure and temperature exist, and where more elaborate surveying is desirable. This type of survey rake is usually located at the nozzle discharge and is mounted directly on the exhaust tailpipe.

Figs. 5 and 6 plot, for comparison, thrust and flow calibration factors (C_f) from a series of tests of an I-40 turbojet, with four different exhaust tailpipes and utilizing both a nozzle discharge survey rake and an instrumented ring. Engine speed divided by the square root of the inlet air temperature is the abscissa. The higher values correspond to rated speed of the I-40 at sea level temperatures. The survey rake gives higher and more consistent readings than the instrumented ring in the case of the I-40, and, in general, would be the preferred method of instrumentation for this engine.

As observed from Figs. 5 and 6, the type of pipe—degree of taper, length, type of jet nozzle, etc.—has a marked effect on the calibration factors. Hence, it is generally recommended that the particular tailpipe used with the engine and either the jet jozzle survey rake or instrumented ring be calibrated together on a static test stand before flight testing.

Since these methods for evaluating thrust in flight are indirect by nature and involve calculations and somewhat veriable calibration factors, there has been a decided interest in the direct measurement of thrust in flight—usually by ascertaining engine mounting trunnion forces as is done in static ground stands.

In most flight installations, space is not available to do the precise measuring job done on the ground. Most feasible scheme from an installation standpoint is the use of strain gages on flexible trunnion mounts, but because of temperature variations under changing conditions of flight, this has not proved completely practical as yet. Another scheme that has been proven on flying test bed installations is that of measuring thrust in terms of pneumatic pressure applied to a counteracting piston to prevent appreciable axial movement of the unit in the absence of any restriction. The installation shown in Fig. 7 illustrates this principle.

Engine mounting trunnions, carried by two vertical arms pivoted in roller bearings at their lower ends, are also mounted in anti-friction bearings at the upper ends of the arms. Engine front support is similarly attached at both ends so that no force is exerted on the engine except in a vertical direction. Tailpipe and shroud are supported by ball bearing rollers in channels attached to fuselage, and thus, this entire unit—tailpipe and shroud assembly—would be free to move a short distance axially were it not restrained by the two pneumatic thrust pistons at the end of the triangular arms. These pistons are actuated downwardly by air bled from the compressor discharge. Air pressure required to balance the thrust is then measured on a sensitive gage mounted at the operator's panel.

Whether the thrust reaction be measured by strain gages or pneumatic pistons the measurement will be net thrust, that is, jet thrust minus ram drag, corrected for effects of unbalanced static pressures acting across the unit and tailpipe, and any engine weight component along thrust axis.

► **Determination of Burner Blowout**—When a turbojet is throttled to reduce engine speed at high altitudes, some, or all, of the burners may blow out, and it may not be possible to restart the engine without descending to lower altitudes. Hence it is necessary to establish this lower limit of operation in flight tests of early engines.

One of the most practical methods developed to establish such a limit is by the installation of thermocouples in the engine exhaust tailcone, just aft of the turbine wheel. These units are installed circumferentially so that each thermocouple will effectively "see" the gas discharge temperature from a single burner. Each thermocouple is connected to a separate temperature indicator mounted on the operator's panel or in a photo recorder. A sudden drop in thermocouple temperature at once evidences the blow-out of the corresponding burner.

There are some disadvantages associated with reading individual thermocouples to determine burner blowout—inherent time lag in the thermocouple and temperature indicator, and unbalance of temperatures in burners, sometimes making it difficult to differentiate at the low speeds when a burner is near blowout. Hence, other schemes have been proposed, such as utilization of an electronic type flame detector and measurement of differential expansion of a burner inner tube with the outer tube.

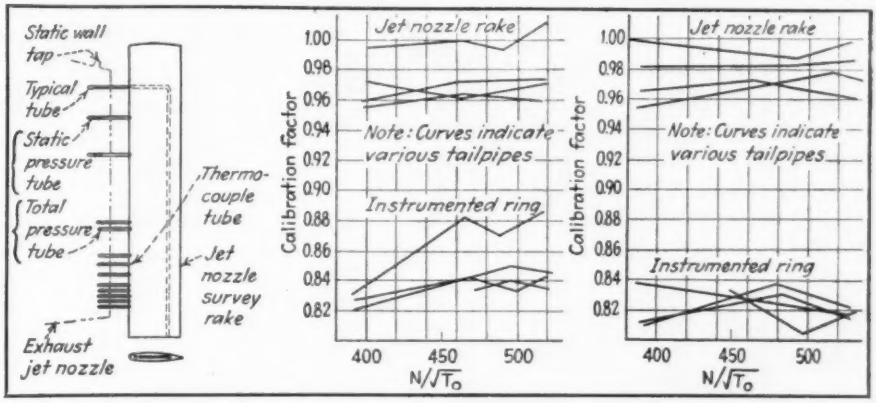

Fig. 4. Typical jet nozzle survey rake installation.

Fig. 5. Chart of thrust calibration factors.

Fig. 6. Chart of gas flow calibration factors.

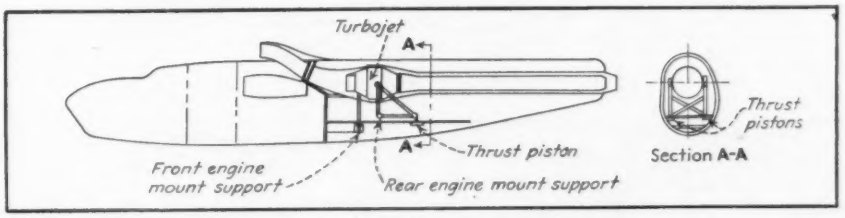

Fig. 7. Diagram of flying test lab (B-24), with turbojet installed in thrust cradle.

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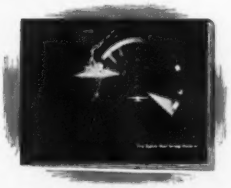

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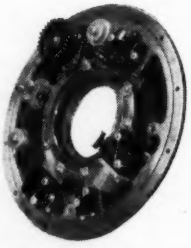

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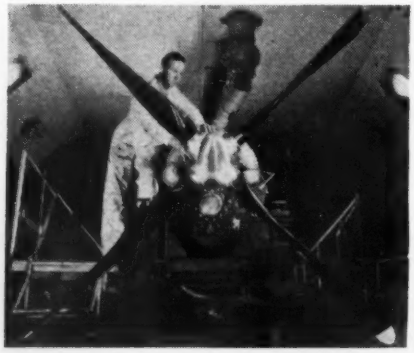

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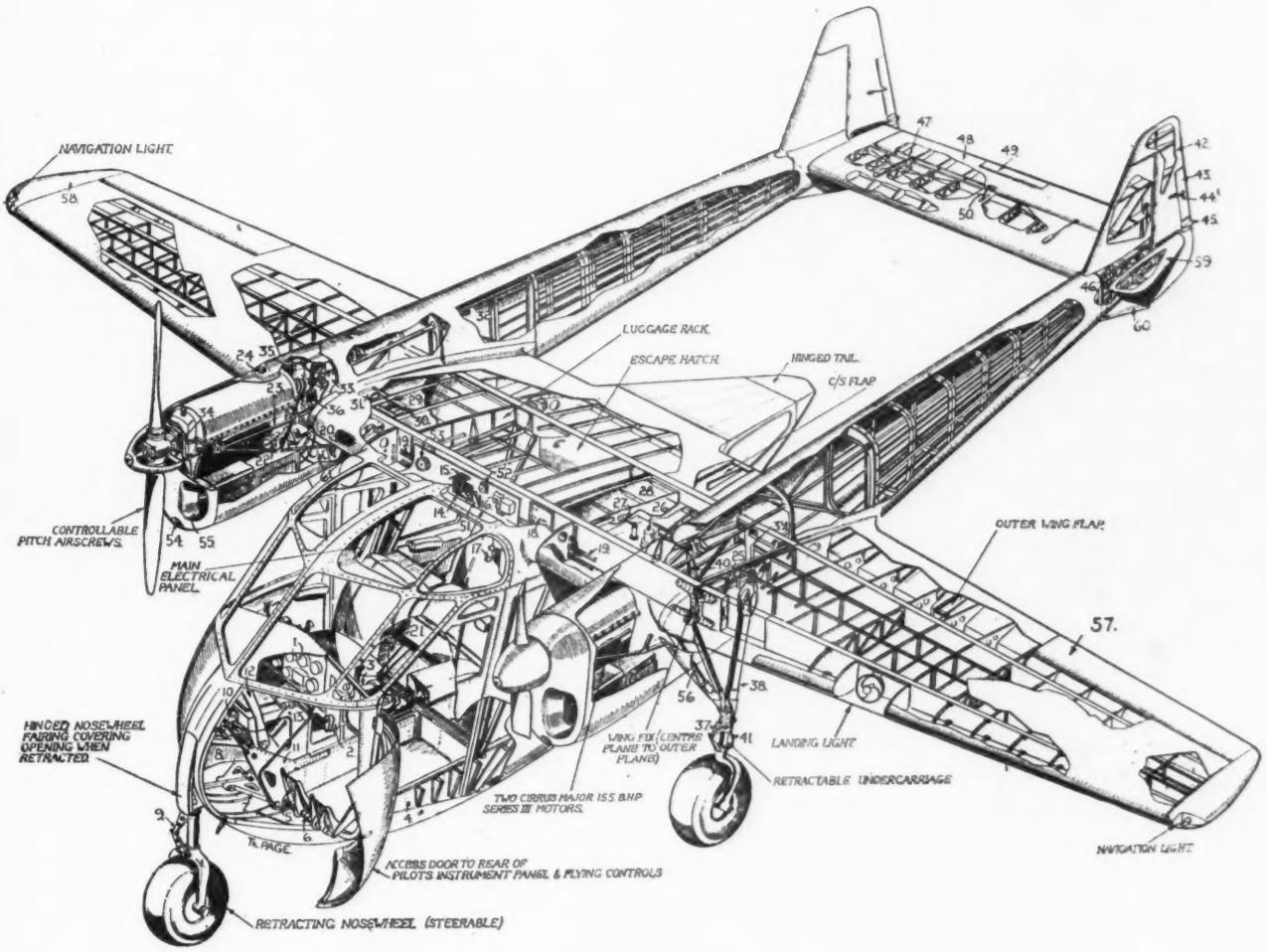

Portsmouth Aviation's Aerocar

Cutaway drawing reproduced through curtesy of The Aeroplane, showing: (1) instrument panel; (2) aileron control housing; (3) control column; (4) side beam; (5) rudder pedals; (6) rudder control layshaft; (7) nosewheel radius links; (8) nosewheel attaching casting; (9) nosewheel torque links; (10) nosewheel steering control; (11) fuselage keel; (12) elevator control; (13) flying control housing; (14) junction box; (15) electric cable runs; (16) suppressor, voltage regulator and cut-out; (17) fuel valves; (18) fuselage-center section attaching point; (19) engine control runs; (20) cabin heater intake; (21) direct vision windshield; (22) magneto; (23) engine mount; (24) generator cooling air intake; (25) main landing gear radius links; (26) fuel booster pumps; (27) fuel gage; (28) and (29) 60-gal. fuel tanks; (30) vent pipe; (31) filler cap; (32) main gear wheel housing; (33) firewall; (34) prop operating unit; (35) starter; (36) air compressor; (37) landing gear torque links; (38) main gear strut; (39) upper attachment link; (40) landing gear retracing jack; (41) brake cable; (42) rudder; (43) trim tab; (44) tab control; (45) tail light; (46) rudder control cables; (47) elevator mass balance; (48) elevator; (49) trim tab; (50) control level; (51) emergency landing gear lowering lever; (52) emergency landing gear pressure gage; (53) warning horn; (54) exhaust manifold cooling air intake; (55) engine cooling air intake; (56) main gear radius rod; (57) aileron; (58) detachable tips; (60) reinforced posts for tail down landing; (61) 2.5-gal. oil tank. Prototype, of composite wood-metal construction, recently made first flight.

RESEARCH REVIEW

Boundary Layer Control May Offer Safety Increase

Important gains in speed and lift forecast, with reductions in fuel consumption and stall tendencies.

Tremendous gains in aircraft performance and flight safety may be available soon through control of the boundary layer. Among the forecast advantages are:

Possible 25 percent speed increase in certain designs.

Increase lifting capacity by approximately 100 percent.

Estimated reduction of fuel consumption 32 percent.

Reduction of stall tendencies.

Reduced transonic stability difficulties.

Increased rate-of-climb, higher ceilings.

Greatly reduced takeoff and landing distance requirements.

In addition to these performance gains, boundary layer control offers a means of airplane control containing none of the adverse effects of present systems, improves flight characteristics of aircraft and provides a solution to the principal problem of the flying wing. Research data are now available permitting the aerodynamic design of boundary layer control wings, control surfaces and complete airplanes. Final obstacle in the path of its application are efficient mechanical systems to provide the control. This problem is being attacked on a broad front in aircraft covering the complete size range. Utilization of available data on internal flow systems[1] may make possible, solutions to these problems and permit exploitation of the full advantages of boundary layer control systems. This can be done either by sucking the boundary layer down into the wing through slots; by pumping a jet of air into the boundary layer; or a combination of both.

▶ **Pumping vs Sucking**—Tests have indicated that pumping air through a slot into the boundary layer is more beneficial than sucking but requires an expenditure of power three or four times as great as the suction system[2]. Pumping may make possible a virtual "no stall" wing—tests carried to an angle of attack of 42 deg. (beyond the practical range of flight or landing attitudes) failed to indicate a stalling tendency of the wing. There appears little to limit the gains available through pressure boundary layer control, but results indicate a fairly well defined limit to the gains available through suction control. Tests have shown that these suction gains reach a maximum above which additional suction proves fruitless. The effects of suction are easily calculated through available data, whereas pumping data is still inadequate for accurate computation[3]. Low power requirements, insensitivity to slot shape, reduction in slipstream and decreased pressure and volumetric coefficients render suction boundary layer control the most immediately promising method, according to present knowledge.

▶ **Design Data**—Slots vs. porous surfaces—Design data are available on single slots, multiple slots, screens and porous surfaces as entrances for boundary layer suction. The use of a single, spanwise slot has proved the most economical and efficient[3]. The range of flight speeds of the airplane can be increased by the use of several slots, although the number should be held to a minimum. The use of mesh screens has proved expensive in power required and of reduced effectiveness. Flight tests of perforated surfaces have proved inconclusive[4].

Slot location—The optimum location of the control slot is well forward for high angles of attack, at the mid-chord point for a wide range of flight angles, and near the trailing edge for low angles (high speed condition). The highest lift coefficients have been obtained with the slot located on the after portion of the chord. Extension of the laminar flow range of up to 12½ percent has been obtained through the use of multiple slots spaced about 0.05 chord apart[5]. Effective control of the boundary layer on a high-speed laminar flow section has been obtained through slots located at the 45 percent and 75 percent chord points[6]. A promising arrangement is the use of retractable slot covers enabling the pilot to close the forward slot, for example, for high speed and open it during the landing approach. On flapped wings, tremendous gains are indicated by the location of the slot on the flap, rather than on the wing[3]. Compromise arrangement is the location of the slot in such a manner that it is sealed by the retracted flap and opened upon flap extension.

Slot shape—An extremely narrow slot has proved most effective and a width of as little as 1/32 in. appears best within a practical range of wing chords[5]. Best design practice is a sharp leading edge and a smoothly rounded trailing edge slot. To combat internal ducting losses, the slots should be tapered towards the tip, their wide edge nearest the tip, thereby removing the required additional air in the tip region[3].

▶ **Range of Application**—Transport aircraft, the use of boundary layer control on a transport aircraft in the 85-ton class could: increase its speed 22 m.p.h.; increase its economy from 20 miles per gallon to 30 m.p.g.; increase its range from 1700 to 2200 miles and provide 32 percent greater economy of operation than the same aircraft without boundary layer control[7]. A major advantage is the fact that the boundary layer control transport would require 21 percent less runway length.

Jet aircraft—The use of the turbojet engine makes the jet aircraft admirably suited for boundary layer control. The pumping capacity of the engine would permit the use of suction boundary layer control as an intake for the engine and the jet efflux as pressure boundary layer control[8]. In addition, the low velocity boundary layer air could be accommodated by a turbojet engine with slightly higher compression ratio than that now in use[7]. For transonic aircraft, stability problems could be minimized due to the virtual elimination of the turbulent wing wake through the use of boundary layer suction on the wing. Through its ability to increase the lift of a wing, boundary layer control would render thin, high-speed wings more practical and provide a solution to the pressing problem of supersonic wing shapes at low subsonic speeds (during takeoff and landing)[8].

Personal aircraft—The creation of high lift coefficients and stall resisting characteristics makes boundary layer control ideal for personal aircraft. At least one design is now in the preliminary flight test stage using boundary layer control not only for drag reduction but for control. Continuous boundary layer jets are sealed off on the wing and elevator trailing edges, resulting in directional and longitudinal control of the airplane[9]. The application of boundary layer control airfoils of thick section with lift coefficients of the order of 5.0 or 6.0 will provide the lightplane with such slow, short-distance takeoff and landings characteristics as to make it competitive with the helicopter.

Flying wing—Boundary layer control can effectively eliminate tip stalling, the basic problem of all-wing aircraft[10]. In addition, it will permit the use of extremely thick wing sections (30-40%) with the low-drag characteristics of conventional thin sections (10-20%)[8]. In addition, tests have shown that boundary layer control can increase the ratio of Maximum Lift Coefficient to Minimum Drag Coefficient by as much as 150 percent. Since this ration is already approaching 200 with conventional sections, this would make possible ratios of 500 for airfoils alone and 400 for flying wing aircraft, which is twice the optimistic figure of J. K. Northrop[10].

▶ **Future Trends**—The power required to remove the boundary layer must be subtracted from the gain in drag to produce a true index of its efficiency. This indicates that the pumping or suction system must

attain high efficiencies in order that boundary layer control prove practical. Careful design of the internal flow system can reduce system losses to a minimum and obtain the full benefits of boundary layer control in drag reduction. Improved flap design will increase the advantages of boundary layer control by translating boundary layer removal into greater lift coefficients. More highly cambered airfoils will also achieve this greater gain. The possibilities of extremely thick airfoils with reflex trailing edge need energetic exploration due to their tremendous promise as high lift-low drag wings. The immediate future should witness extensive flight tests of boundary layer control to determine its affects on stability and control, little data on which is presently available. Research is immediately needed on the application of turbojet engines as power sources for boundary layer control in view of their rich promise over a wide speed range of this combination. Increasing use of boundary layer removal for control on the series of Northrop flying wings appears assured as well as exploitation by the AAF of numerous radical all-wing designs impractical without boundary layer control. A new promise of boundary layer removal is its application to low-turbulence wind tunnels in which it could provide 180° bends without the use of turning vanes and screens and preserved turbulence-free flow.

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Stinson Boosts July Deliveries Over June Total

Despite faltering production by several other personal plane companies, Stinson Division, Consolidated Vultee Aircraft Corp., Wayne, Mich., has announced an increase in July deliveries of four-place Voyagers and Flying Station Wagons over June deliveries, with 230 planes delivered in July against 224 in June. The Convair Division since the end of the war has manufactured and delivered 3,228 four-place planes, a total larger than the combined four-place production of all other manufacturers, William H. Klenke, Jr., General Sales Manager, announced.

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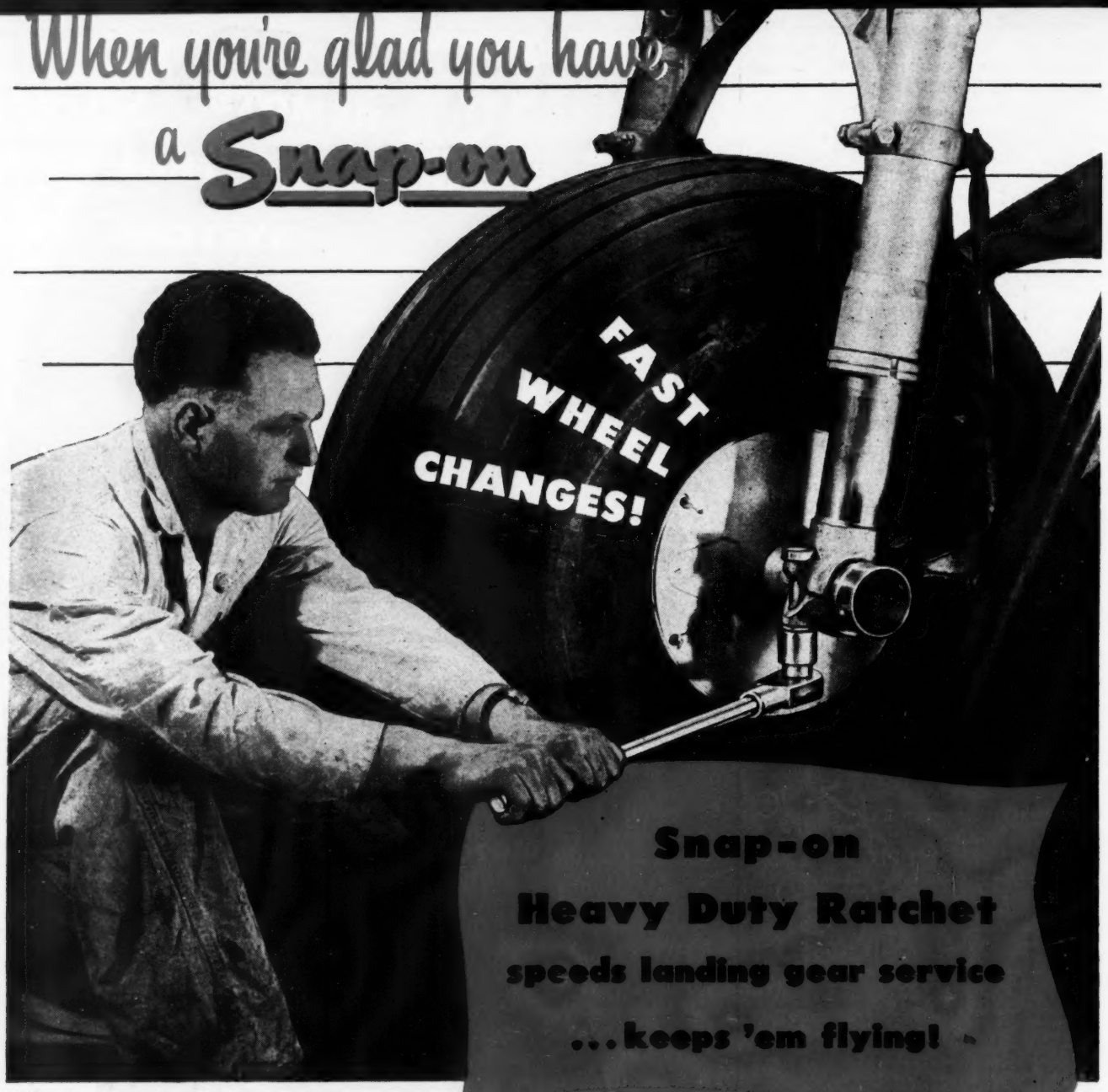

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Airman's Guide Charts Hit In Commerce Economy Shuffle

Pilots pay more, get less under new status; packaged one-volume convenience, cumulative corrections out.

By ALEXANDER McSURELY

A Commerce Department "double-shuffle" between CAA and the Coast and Geodetic Survey, labelled officially as an economy move, has seriously reduced the usefulness of the CAA Airman's Guide and will result in a higher cost to pilots, an AVIATION WEEK inquiry has disclosed.

For the past year the CAA Airman's Guide has been a one-volume compendium issued in a new revised edition every two weeks and designed to give the pilot all the latest information necessary to fly his plane safely and conveniently. For this bi-weekly book 21,000 subscribers were willing to pay $7.50 a year.

► **Last Guide**—The last of these Airman's Guides has gone to press. From now on the pilot will pay almost as much ($6) for much less information. If he wants charts showing radio facilities, such as were provided in the old Guide, he will have to pay an additional $4.50 to get the nearest substitute to those charts now available—the two-color radio facility charts issued by Coast and Geodetic Survey which will cost him an additional $4.50 a year.

Two factors enter into the Airman's Guide changes: an apparent departmental policy that C&GS handle the chart business exclusively, and a demand for a cut in CAA's Information Section, as part of an overall CAA curtailment enforced by congressional budget slashes.

► **Problem of Money**—Whether it was better to turn the axe on the Airman's Guide, or on some of the CAA information section's profusely illustrated, brightly colored aviation books such as the new "Terrain Flying" volume, offers an interesting question. Deputy Administrator Frederick Lee has indicated that additional cuts may also affect such publications.

The Airman's Guide "new deal" offers the subscriber the old CAA Notice to Airman published every two weeks, but now rechristened Airman's Guide. It includes no charts and no data pages. He will also receive a flight information manual and an airport directory, published semi-annually. It has not been decided whether these will be combined as one semi-annual volume or published as two volumes. For this he pays $6 a year. Subscribers under the old Airman's Guide rate of $7.50 will have the unexpired portion of their subscriptions extended at the new rate.

Two items stand out as a distinct loss to pilots in the changes:

- The expiring Airman's Guide provided a cumulative correction of aeronautical charts so that a pilot could correct his old sectional chart merely by reference to the latest Airman's Guide, without going back through old issues.
- Charts in the Airman's Guide indicated all airports including approximately 4,600 which do not have radio ranges or towers. The two-color radio facility charts offered as a substitute do not show airports without radio and list approximately 600 airports.

The new plan for the Airman's Guide resulted in a CAA information office salary curtailment estimated at approximately $30,000 a year.

► **Charts Described**—The C&GS radio facility charts were not started as a substitute for the Airman's Guide charts but have been supplied to airlines and other organizations requesting them since the first of the year. Printed in two colors on much better paper than was used in the Guide's charts and with only radio-equipped airports to show, they are regarded as a valuable aid by virtually all pilots of radio-equipped planes. It is estimated that the C&GS radio facility charts production cost would be approximately 60 percent greater than production cost of the black and white Airman's Guide charts. This does not include mailing costs which were handled by the Government Printing Office for the Airman's Guide.

► **Survey Shows Gripes**—A check of aviation industry and organization representatives in Washington indicated a dissatisfaction with the new arrangement, particularly because of the new setup's scant attention to small non-radio-equipped airports.

A spokesman for Aircraft Owners & Pilots Association said he thought the $4.50 price for the charts was "the best of a bad bargain," and pointed out that this figure had been reduced from an original suggested subscription of $9.00.

A Personal Aircraft Council spokesman voiced disappointment that the Airman's Guide had been curtailed instead of some other less essential CAA publications, and suggested that the best solution would be for Coast and Geodetic Survey to publish the entire guide including the charts, so that it would remain in the handy one-volume package.

CAA officials said they had been advised by the Government Printing Office that the price of the Airman's Guide was too low and would have to be raised perhaps to $10 or $15. This statement also was a factor in the changes.

PRESENTS FIRST AERONCA L-16A

Elmer Sutherland, Aeronca Aircraft vice president and general manager, recently presented the first of the 509 liaison planes designated L-16A, which Aeronca has contracted to supply to the Army ground forces. Presentation was made to Gen. James S. Stowell, chief of administration, Air Materiel Command, Wright Field.

At the oldest airport in the United States...

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College Park Airport, Maryland, developed in 1909, is the oldest airport in the United States. Here "Hap" Arnold trained! Here Instrument Landings were pioneered! Here Esso Fuels and Lubricants power the flights!

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Mr. Brinckerhoff writes: "It just makes good sense to go along with Esso Aviation Products—products of high quality since the days of Kitty Hawk. With them, customer's confidence and satisfaction is assured! For quality, fine performance and dependability, it's Esso all the way."

At the oldest, and at many of the country's newest airports, Esso Aviation Products are winning new friends, and new recognition for quality, dependability and service.

Opens New Rest Haven for Tired Pilots, Planes

Service for airplanes and relaxation for their pilots is the salable "double feature" offered, primarily for professional pilots of executive and company planes, by the "Dunroamin' Lodge—Pilots' Haven" operated by C. V. Hopkins, Easton, Md.

Early this year Hopkins moved his National Airmotive Corp. from Baltimore to Easton airport, and purchased an estate on Chesapeake Bay, eight miles away, which he has converted to accommodate the pilots during their wait for their planes. His service includes complete inspection, repair and overhaul for executive aircraft, plus lodge facilities for the crew, including quick laundry, meals and even icebox raiding privileges, all at a single charge.

Hopkins knows the wandering life an executive plane pilot leads, because he spent several years as a pilot for P. K. Wrigley, chewing gum manufacturer, and Earl Halliburton, California mining and oil well supply manufacturer. Trips planned for days stretched out into weeks, with ensuing laundry and hotel difficulties. Hopkins once bought 60 shirts because of laundry delays during a single extended trip. Whenever it came time for extended servicing or plane overhauls, Hopkins spent his time in a hotel, with taxi fares out to the airport to check on the plane's progress.

He is slanting the customer appeal of "Dunroamin' Lodge" to pilots such as he once was, who would welcome a chance for a few days vacation while their plane is being overhauled. And he points out that although there are a number of aviation country clubs being developed about the country, his is, as far as can be ascertained, the only one which caters exclusively to executive aircraft crews, and which makes its complete maintenance and overhaul facilities a main attraction for patronage.

Centralization Affects CAP

Civil Air Patrol, headquarters will be established at Mitchell Field, N. Y. under a new centralization plan which makes the volunteer patrol an auxiliary of the Air Defense Command of the Air Forces. Lt. Gen. G. C. Stratemeyer, ADC commanding general has announced. Brig. Gen. F. H. Smith, Jr., Air Forces officer assigned as national CAP commander will continue to have a CAP officer in Washington for liaison purposes. Currently the organization of private flyers includes 49 wing organizations, one for each state and Territory of Hawaii.

Principal activity of the senior patrol members is an aviation training program for CAP cadets, boys and girls 15 to 17 years old. Program calls for training of approximately 75,000 cadets.

Second WASP Reunion

Second annual reunion of the Women's Air Force Service Pilots (WASP) many of whom now are instructors or pilots for various aviation business firms, will be held at Ponca City, Okla., Aug. 25 to 27, on invitation of William T. Piper, president of Piper Aircraft Corp. They will be entertained at the Piper Ponca City assembly plant and by local civic organizations. The Order of Fifinella as the WASP alumni group is called, will conclude the session with a flight by many of the members to Cleveland to attend the National Air Races.

Stinson Dealers Aim At Over-35 Group

Stinson dealers and distributors have been instructed to find their primary sales prospects among persons over 35 years old, since this age group is indicated by surveys and studies, including one recently completed by CAA, to be the group most economically qualified to buy a personal plane.

To assist its dealers in maintaining up-to-date sales prospect files, the Stinson sales department is making available to them a combination prospect file and follow-up with alphabetical filing of all sales prospects, and also an automatic follow-up system on "live" prospects at periodic intervals. The follow-up system files prospect cards by dates of next call or next contact by direct mail advertising, so that the salesman will be reminded to renew his selling effort on each individual prospect, periodically. The system has been "field-tested," the sales department reports, to prove its efficiency, and has been developed in response to appeals from Stinson dealers for a prospect file.

Third Hoppicopter May Fly At Cleveland

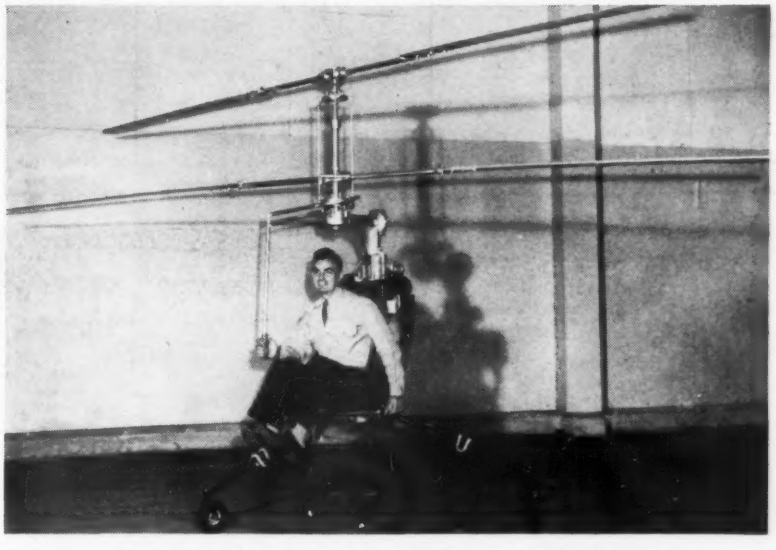
The Seattle Pentecost hoppicopter, originally designed as a personal helicopter to be strapped on the back of the wearer, now has been developed into a new tripod version, Model 103, which has a more powerful engine, is larger and heavier, and is expected to attain forward speeds as great as 90 mph.

Still a one-man lightweight device, the new Model 103 has a modification of the tripod landing gear used on the second hoppicopter, a more comfortable seat, and major rotor modifications. It weighs 175 lb. as compared to 105 lb. for the earlier tripod version, has a 35 hp. engine instead of a 25 hp. powerplant and is 8 ft. tall instead of 6 ft. It is estimated to carry a useful passenger load of 250 lb. instead of 180 lb.

The two counter-rotating rotors have increased diameter 16 ft. instead of 13 ft. 6 in. and as an added safety factor have been spaced farther apart on the shaft amounting to 25 percent of the radius instead of 10 percent. Rigidity of the earlier rotor has been modified to allow a certain degree of blade "flapping" and to permit lighter rotor construction.

The tripod landing gear has been strengthened, and shock mounts have been installed on each of the three wheels.

Horace Pentecost, the inventor, estimates the new Hoppicopter will cruise for 60 to 90 minutes on 2½ gallons of fuel. A service ceiling of 12,000 ft. the same as for the earlier Model 101, has been fixed as about the maximum height any hoppicopter flyer would wish to attain in the "open-air" flying machine.



FIRST PHOTO OF NEWEST HOPPICOPTER

New Model 102 of the Pentecost Hoppicopter, one-man helicopter, is undergoing tethered flight tests inside a hangar in preparation for a first public flight demonstration at the National Air Races in Cleveland, Aug. 30. Photo shows Maurice Ramme, test pilot for Hoppicopter, Inc., Seattle, seated in the new 102.

Versatile Helicopters Hoist and Patrol Lines

Two western helicopter operators, Armstrong-Flint Helicopter Co., Los Angeles, and Central Aircraft, Inc., Yakima, Wash., are using their Bell Model 47-B helicopters in a variety of special purpose jobs including power patrols and other assignments.

The Armstrong-Flint helicopter assignment to hoist three large electrically operated crosses up a Hollywood hillside for use in the Pilgrimage Play, however, is probably one of the most unique tasks which has yet come to the rotary-wing aircraft. It was estimated it would have taken six men a full eight-hour day to get the material to the top. But the material was divided into nine loads which the helicopter hoisted in 22 minutes. Each cargo load was hooked to a 10 ft. cable suspended from the helicopter, which enabled the helicopter to rise to 10 ft. altitude before it picked up the load. It also made it possible for the helicopter to hover above the unloading stage while the equipment was being unfastened. The unloading platform, 22 by 4 ft. was just below the summit on a narrow ledge and the operation called for precision flying to keep rotor blades from striking overhanging bushes and jutting rocks.

The Los Angeles firm has also been awarded a four months contract for a test of the helicopter in powerline trouble shooting for the Los Angeles department of water and power. Contract calls for 200 hr. flying for $10,000. Low-level powerline photography and visual inspection of tower insulators will be part of the test which will include a cost study in comparison with costs of other means of inspection.

Central Aircraft, Yakima, has been awarded a contract to patrol and inspect by helicopter the Canol pipeline in northern Canada. The helicopter will be taken by steamer to Ketchikan, Alaska, and then flown to Whitehorse, Yukon territory, and on to the Canol operation. Tom Hall, pilot, expects to complete the patrol in 10 days to two weeks.

Approximately 150 hrs. of helicopter flying were logged recently by John Steen, another Central Aircraft pilot, in a recent three-month experimental inspection contract for the Bonneville Power Administration. The system contains about 3,000 miles of line strung over 2,400 miles of right-of-way in Washington and Oregon, and the line runs through steep-walled canyons and across great timbered areas. Three inspection trips in three months were made by the helicopter patrol carrying a Bonneville lineman who checked the powerline from overhead and from 50 ft. alongside or even closer to check broken insulators, falling timber etc. Leland F. Murray, superintendent of transmission maintenance, estimates that the helicopter patrol does the job at about half the cost of foot patrols. Decision of the Bonneville administration on whether to let a long term contract for helicopter powerline observation is being awaited.

New Toledo Operation Plans 24-Hour Service

Walter R. Crow, Inc., new aircraft repair and maintenance service, which has leased property at Toledo (Ohio) Municipal Airport expects to operate on a 24-hour day basis, the first operation of this type in the state, the new company claims.

The Crow operation will handle SOHIO (Standard Oil Company of Ohio) products, and will offer complete maintenance and repair shop facilities for all private aircraft, President Walter R. Crow, announced. Maps, fuel, field repairs, and local travel and weather information will be available at all hours at the base. Contract has been let to Nesmith and Roberts, Houston, Texas, for a steel prefabricated shop building 30 by 110 ft. and construction has been started on a building to house service, parts and restrooms. More than $40,000 is being expended in the building program.

SIGLER GETS BONANZA

Air-minded Gov. Kim Sigler of Michigan recently took delivery on a new four-place Beech Bonanza at factory in Wichita. Above, Gov. Sigler is shown (center) with Walter H. Beech, President (left), and Mrs. Olive Ann Beech, secretary-treasurer, when the plane was accepted.

Calls Plane Farmer's Key to City Life

Describing the personal aircraft as the farmer's "key to the city," John W. Friedlander, Aeronca President and chairman of the AIA Personal Aircraft Council, recently told the National Flying Farmers Association: "The presence of a plane out there on the farmer's own flight strip has served to completely wipe out the isolation which years ago was turning the footsteps of the average farm youth away from the land."

Addressing the NFFA annual convention in Stillwater, Okla., Friedlander pointed out: "The continuing increase in farm flight will undoubtedly bring about a development not at first envisioned by your organization. Ironic as it may seem to some of our city friends, the fact remains that they are going to have to become progressive and up-to-date if they expect to enjoy your patronage in their economic life and your presence in their social life." He believes that the flying farmer will fly up to 100 miles to a more hospitable city with close-in airpark to avoid a nearby city with an airport five or ten miles out of town.

William F. Piper, president of the company bearing his name, described the personal airplane as "an important piece of utility equipment on the farm" and the answer to the World War I song question: "How You Gonna Keep 'Em Down on the Farm?" Before 2,000 members of the flying farmers of Prairieland, Illinois, Indiana, Michigan and Wisconsin, at Urbana, Ill. "For the city dweller," Piper said, "a plane is a luxury; on the farm it is gradually becoming a necessity."

Missouri Airport Progress

In the last three years 103 airports of all types have been added to the 28 designated airports in use in the state of Missouri on July 1, 1944, a report of the Aviation Section, state division of Resources and Development has announced.

Eugene Fryhoff, head of the Aviation Section, points out that while some of these were fields which had been closed during wartime, the majority were new fields developed to serve communities and for GI training. The seven year national airport program calls for new airports or improvements to existing fields in 188 Missouri communities with 32 tentative allocations for Missouri airport projects made by CAA for 1947.

A Memorial Airfield Act, passed by the Missouri General Assembly, which makes $250,000 available in amounts up to $10,000 to match community funds for airports, has already resulted in 29 communities receiving state grants, which will aid them in matching federal grants. A total of 85 flying schools have been approved in the state for GI training courses.

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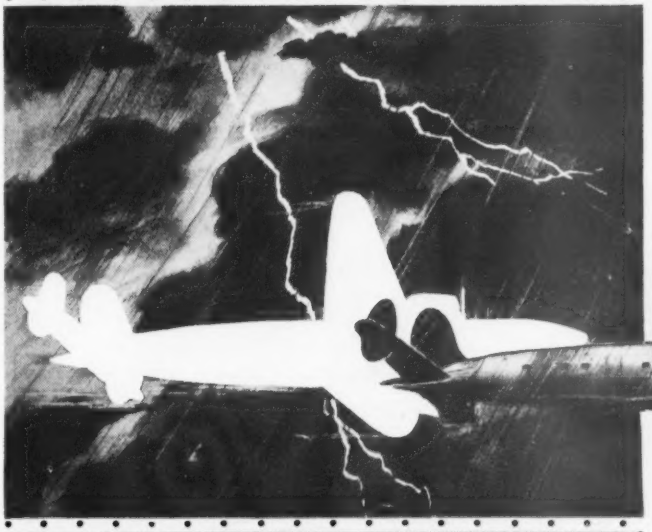

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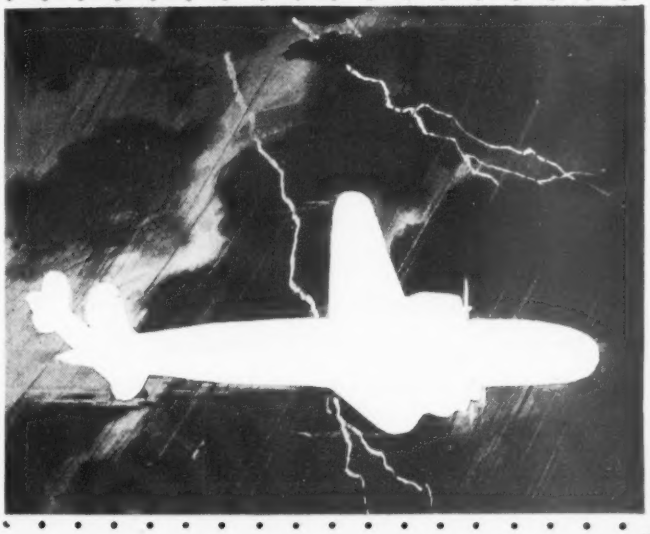

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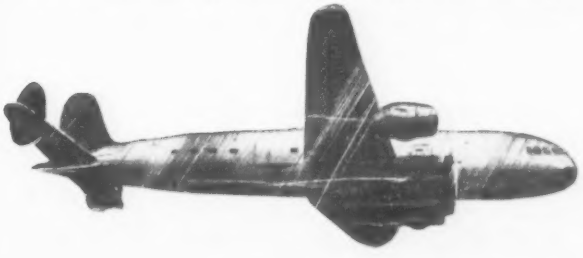

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NAA Airport Awards

Inspection of airports for award of the National Aeronautics Association certificate of good operating practice has started, Jerome Lederer, NAA Vice-President, Safety Division, has announced.

Requirements have been revised providing credit beyond the basic safety requirements, for additional safety services for the private flyer, such as ground-to-air communication, good servicing, adequate transportation, etc. Evidence must show that airports qualifying for the certificate have at least 50 percent of the additional "desirable items for safe operation," besides the basic minimum requirements.

Last year 79 airports received awards. Certificates are to be awarded at simultaneous dinners Dec. 17, the 44th anniversary of the Wright brothers' first flight at Kitty Hawk, N. C. Approximately 20 other aviation groups in addition to NAA are co-operating in the airport safety campaign.

Anchorage to Minneapolis

Lightplane flying between the States and Alaska soon will be commonplace. That is the prediction of Ben B. Edwards and Jim Tapscott, Anchorage, Alaska, businessmen who recently completed a 3,565 mile hop from Anchorage to Minneapolis in a two place Swift.

Flying time was 31 hours and 50 minutes. Total cost was about $175, including gas and oil, food and lodging at Royal Canadian air barracks and a check of plane engine and radio at Edmonton, Canada.

Edwards is with Shaw-Edwards-Goodman Construction Company, Anchorage, while Tapscott owns Air-News Co., newspaper and magazine distributing firm, Anchorage.

Cascade Emergency Fields

Washington State Aeronautics Commission has called bids for the first of several emergency landing fields authorized in the Cascade Mountains dividing the state east and west.

First project is Bandera Field in Snoqualmie Pass about 14½ miles east of North Bend. The field will be 2,400 ft. long and 300 ft. wide with turfed runway. Other fields, designed to prevent mountain crashes which have been rather frequent in recent years, are proposed.

Parachute Delivery

Veterans Air Service of Grants Pass, Ore., has contracted with Richard Marvin, timber contractor of that city, to deliver supplies by parachute to lumber cruisers in the inaccessible areas northwest of the cities. Contract calls for air delivery every eight days, the first drop including 650 lb. of foodstuffs and other supplies in 13 packages. Phil England and Donald Kelley, the operators, use a Stinson Reliant in the service.

BRIEFING FOR DEALERS AND DISTRIBUTORS

CROSSWIND WHEEL CERTIFICATION—Issuance of CAA approved type certificate No. 179 for the Goodyear Aircraft Corp. cross-wind landing airplane wheel, puts the castering gear and the one-way airstrip in a new and more favorable light. Up till now, all the castering gear developments have been strictly experimental. Now CAA has put the stamp of technical approval on the Goodyear wheel as a safe and sound article for commercial sale. Goodyear currently is completing a study of production costs on the castering wheel, and if costs indicate it will be salable, it will be manufactured and marketed through Goodyear aviation products distributors. Aimed at making one-strip landing facilities usable regardless of wind direction, the whole castering gear development promises to be an important single factor in increasing the utility of the personal airplane.

LOW FLYING IN JERSEY—Legislative steps to curb reckless low flying in New Jersey, have been suggested as a result of airplane noise complaints at Madison, N. J. A suggestion that the State Public Utility Commission be charged with regulating air flights, has been made to Gov. A. E. Driscoll, who has indicated a study of "appropriate" legislation will be made for introduction at the next session of the legislature.

SECOND AIRPHIBIAN—The No. 2 Fulton Airphibian, closely similar in most respects to the original prototype roadable plane announced last November by Continental, Inc., at Danbury, Conn., is starting CAA type certification tests at Danbury Airport. Robert E. Fulton, inventor of the plane and head of the company, and J. M. Dickey, general manager, are still awaiting further tests before committing the company to any production plans, despite good service test experience with the first flying auto both on the ground and in the air.

SKYWAY SURVEY—Survey flight for the proposed Skyway No. 1, transcontinental airway for private flyers from Washington, D. C. to Los Angeles, is tentatively scheduled for early September, with Los Angeles Chamber of Commerce and Washington Board of Trade officials participating. The flight will take approximately 10 days including stops and checks of alternate airport facilities and community facilities for overnight accommodations of touring private flyers.

BONANZA AIRMAIL—Versatility of the four-place Beech Bonanza, is indicated in announcement that the Cuban army air force has taken delivery on five of the planes and is expecting to get four more—seven to be used in a feeder airmail network. When the network is set up, all Cuban mail will be carried by plane, according to Lt. Col. Camilo Chavez, Cuban air force chief, with army pilots doing the flying. The Bonanzas will feed the mail into a main air line, and the Cuban postoffice system will use 60 jeeps to haul mail between airfields and postoffices. It is believed that Cuba will be the first nation to have an all-air mail system.

FOR FUTURE FLYERS—Airport operators troubled by the younger generation, which insists on clambering all over available airplanes with resultant major damages to fabric and skin, can take a tip from the Laconia, (N. H.) airport, where a surplus B-17 flying fortress, whose flying days are over, has been parked behind a fence, specifically for the youngsters to play with. They can get inside or on any part of the sturdy all-metal plane, which probably gets as tough a "beating" in this assignment as any combat plane ever took. Not every airport has a surplus B-17 or can get one, but many airports have some kind of an old unairworthy airplane which will not be flown again, but which very well could serve such a purpose.

REDWOOD EMPIRE—Enterprising promoters of resort and tourist areas are including aviation information in their data for prospective customers, and smart airport operators will see to it that their facilities are listed in booklets and literature that go out from their areas. Probably the neatest regional aviation promotion material of recent date in this line, is a folder being distributed by the Redwood Empire Association, San Francisco, which maps 37 airports within the northern California-Oregon area included in the "empire," and lists information for flyers on the facilities of each airport.

PRIVATE FLYERS LIMITED—Further indication that the annual winter migration of private flyers to Miami for the January Air Maneuvers will not be what it used to be this winter is seen in recommendation by S. C. Huffman, general manager of the Miami show. Huffman recommends limiting private flyer attendance to "an invitational affair, or at least to such size as we can adequately control and handle." Gulf Oil Company, which for a number of years has sponsored an annual private flyers tour to Miami in January, coinciding with the date of the maneuvers, has indicated it may not again provide the free fuel and oil for the thousands of south-bound private flyers this year, but will spread out its tour sponsorships in a series of state tours. Observers for aircraft manufacturers after last year's show seriously questioned the value of the exhibition in promotion of personal flying and pointed out that the tour sent thousands of relatively unexperienced pilots south through serious winter weather hazards. To offset the expected loss of the bulk of the private flyers, the Miami show this year proposes to set up a total of $66,500 in prize money for the various races and events.

Alexander McSurely

How to Hold Cash, Pay Dividends Is Manufacturer's Current Problem

Questions by anxious stockholders may lead management to establish new dividend policy.

Contrasting dividend action by Grumman and Consolidated-Vultee reveals the selective character of underlying conditions in the aircraft industry.

The investment public was taken unaware by the surprise announcement of the Grumman dividend of $1.50 per share payable Aug. 21, 1947. This followed on the heels of the Consolidated-Vultee failure to pay the regular quarterly dividend due at this time.

Currently, few aircraft builders are showing profitable operations and are under pressure to husband cash resources. As a general rule, most companies experiencing active production levels have substantial commitments in inventories and must finance such requirements through their own cash accounts, bank loans or a combination of the two. Such an atmosphere is not conducive to dividend disbursements. When bank loans prevail, there are definite restrictions against dividend payments for the protection of the debt.

▶ **Grumman Is Exception**—Grumman, thus far, has proven to be one of the exceptions to the general rule. The company is in a peculiarly strong financial condition with no inventory problem. Net working capital is currently estimated at around $40 per share. A production order from the Navy for the Bearcat (F8) is believed to assure the company of current profitable operations. Grumman is also unique in that it has shown profitable results every year since its inception some 17 years ago. Moreover, it has paid dividends in each of these years.

Another factor encouraging dividend payments, wherever earnings permit, is the revision of Section 102 of the tax regulations. This provision virtually makes mandatory payment of dividends out of current earnings if a company shows an unusually large working capital balance and has retained a large portion of previous years' earnings.

It is probable that Grumman may make another dividend payment later this year when final results become more clearly defined. This payment can easily be another 50 cents per share, thus equalling the $2.00 per share paid in 1946 and surpassing the $1.50 paid annually in the preceding four years as shown in the accompanying table.

▶ **Convair Dividend Small**—The Convair management attributed its action to the "uncertainties confronting the industry." The company paid dividends of 25 cents per share each of Feb. 20 and May 15 of this year. In the face of mounting deficits, however, dividend payments are most difficult to maintain. Previous 1947 payments were made out of surplus. For the six months ended May 31, 1947, Convair reported a net loss of $769,827 after giving effect to a $1,708,206 carryback tax credit and after charging $1,782,827 for experimental and development work. The continuation of the dividend payments would have meant an outlay of about $392,500 quarterly.

For a number of companies, dividend policy will be established in consideration of factors other than current earnings or immediate outlook. For example, there have been increasing indications of dissident stockholder groups who are prepared to sharply question certain management practices. Frequently, the best way to placate such groups and to divert their force, is to make regular dividend disbursements.

▶ **Stockholders Challenged**—The Bell management was recently challenged by a stockholder group but prevailed over the opposition. It is fair to surmise that the company may pay at least 50 cents per share this year. Bell showed earnings of 30 cents per share for the 13 weeks to March 29, 1947. Current operations in view of the extensive helicopter development, are believed to be running at a loss. However, the company last showed a net working capital of more than $11 million. This financial condition can readily permit a minimum payment of 50 cents per share or a total of $217,395 on 434,789 shares of common stock outstanding.

Another company which may find itself in a tenuous position pertaining to stockholder criticism is Curtiss-Wright Corporation. Its off-again on-again dividend action on the "A" stock last year gave the management an unpleasant time and exacted the promise that it would not happen again. The company has a total of 1,158,702 shares of Class "A" stock which carries the non-cumulative dividend rate of $2.00 per share. It is quite likely that the annual payment of $2,317,302 in dividends may be made on this class of stock for 1947. This would remove one possible source of complaint from stockholders. On the other hand, it may be difficult to see a 50 cents disbursement this year on the common stock as was made during 1946. Such a payment would aggregate $3,715,165 and presumably would only be made if circumstances so dictated. The company's financial position would readily permit such payments.

▶ **United Should Maintain**—Similarly, United Aircraft may be expected to maintain the annual $5 dividend on its preferred share this year regardless if earned. This class of stock has been a source of contention among many shareholders. When this preferred was sold to the public early in 1942, investment sources are believed to have represented that this security would be retired shortly after the war as the proceeds were to be used to bolster the company's invested capital base to help finance war orders and minimize excess profits tax imposts. However, at the last annual stockholders' meeting, they disclaimed any intention of retiring this preferred.

In the absence of special circumstances, reduced or omitted disbursements are expected to form the dividend pattern for the aircraft industry during 1947.

▶ **Dividends Discouraged**—Aircraft equities have always enjoyed their chief attraction as a possible medium for capital appreciation; they were rarely considered desirable vehicles for sustained dividend income.

—Selig Altschul

CASH DIVIDEND RECORD
(Per Share)
Representative Aircraft Manufacturing Companies

Company	*1947**	*1946*	*1945*	*1944*	*1943*	*1942*
Beech	nil	nil	$1.00	$1.00	$1.00	$1.00
Bell	$0.50	$1.00	1.00	1.00	1.00	2.00
Boeing	1.00	1.00	1.00	2.00	2.00	1.00
Cessna	nil	0.15	0.25	0.40	1.00	1.00
Cons-Vultee	0.50	2.00	2.00	2.00	1.50	3.00
Curtiss-Wright—A	2.00	2.00	2.00	2.00	2.00	2.00
—Common	nil	0.50	0.50	0.75	0.75	1.00
Douglas	5.00	7.50	5.00	5.00	5.00	5.00
Fairchild E. & A.	nil	nil	0.20	0.20	0.20	nil
Grumman	2.00	2.00	1.50	1.50	1.50	1.50
Lockheed	nil	1.00	2.00	2.00	2.00	2.00
Martin	0.75	3.00	3.00	3.00	3.00	1.50
North American	nil	1.00	1.00	1.00	1.00	1.25
Republic	nil	0.25	0.50	0.50	0.25	nil
United Aircraft—pfd	5.00	5.00	5.00	5.00	5.00	5.00
—Common	1.00	1.00	2.00	3.00	3.00	3.00

Note—*Total paid thus far or ESTIMATED to be paid for 1947.

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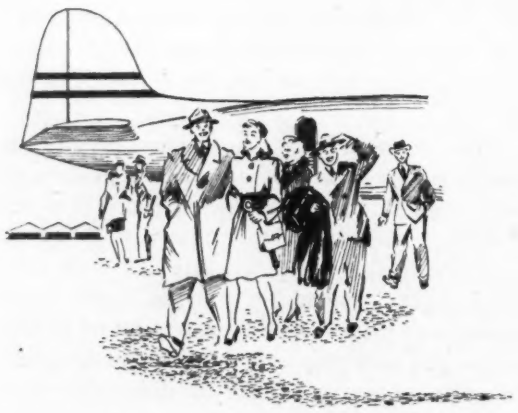

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CAA to Continue Fight for ILS Omni-Range Airways

T. P. Wright admits ILS has operational bugs; fears government liability in GCA crashes.

Civil Aeronautics Administration plans to stand pat against a rising tide of congressional criticism over its VHF navigation aids program in the hope that performance of its instrument landing system during the coming winter will be good enough to make a strong talking point for funds when its budget for next year comes up for congressional scrutiny.

This year, Congress eliminated all funds for further ILS installations and drastically slashed items earmarked for other bad weather flying aids on the ground. CAA had not properly co-ordinated its federal airways program with military needs, necessitating a costly duplication of air navigation facilities.

▶ **Observes Skeptical**—CAA now has fund for 98 ILS installations but observers are skeptical of CAA's ability to get them installed and in working order before the bad weather flying season begins. A survey of ILS installations installed last spring indicated that few were operational.

T. P. Wright, CAA administrator, now admits that ILS has certain deficiencies and is subject to operational "bugs" under some condition but believes that with all its faults ILS is more suitable for commercial use than radar ground control approach. Among the operational bugs of ILS listed in a CAA report on the subject are:

- Terrain difficulties requiring careful positioning sometimes cannot be eliminated.
- Courses may be deflected by objects near transmitting antennae such as aircraft and motor vehicles.
- Certain localizer and glide path courses are not straight and therefore difficult to fly.

The CAA report claims that ILS is not affected by precipation. However, the landing aids experimental station at Arcata, Calif., had so much trouble with ILS deflections from wet ground during and after heavy rains that it was necessary to lay portable steel landing mats to shield the radio signals from the wet ground.

CAA also claims that aircraft on the beam do not appreciably screen the beam from following planes, but pilots who have air tested the systems offer considerable testimony to the contrary.

▶ **Clue to Objections**—CAA offers a clue to its strong objections to GCA in this report, opining that "legal liability for improper control of aircraft by GCA units might fall on the government." Airline pilots using CAA experimental GCA units at Washington and New York have been highly critical of the controllers' abilities. In contrast to these operations, the CAA GCA unit at Chicago has a highly efficient operating record and has already saved three aircraft that would have been unable to land without GCA.

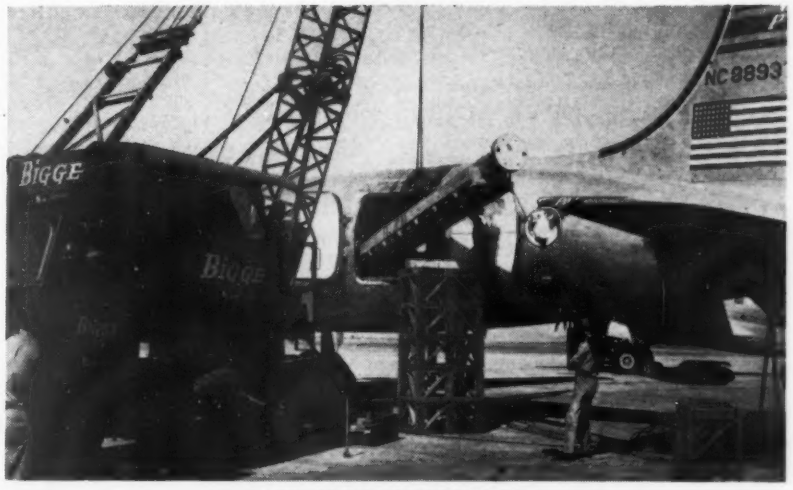
Cost figures cited by CAA on GCA also seem high. CAA claims that a complete GCA unit including surveillance radar would cost $150,000 or about twice the current commercial market quotations on such equipment.

Commercial airlines are expected to be 100 percent equipped with airborne ILS localizer receivers before the bad weather season this winter. However airline pilots insist that the ILS localizer course be supplements by compass locator stations. The pilots official attitude is that they can make all low approaches required using compass locator stations alone. It is generally conceded among airline operating personnel that the ILS glide path is too unreliable for regular use.

Wright scoffed at use of a radar airway as recommended by the Hinshaw Subcommittee of the House Interstate and Foreign Commerce Committee as not justified on ground of cost, power requirements and weight. Both Army and Navy are planning extensive radar airways on both coasts and along at least two transcontinental airways.

▶ **Pan Am Radar**—Meanwhile Pan American Airways, which was instrumental in getting a GCA unit installed and approved for operations at Gander, Newfoundland, has arranged loan of an AAF search radar unit with a 100 mile range to supplement the GCA unit for long range traffic control at Gander. Indications are that the North Atlantic, key to profitable overseas operations, will be completely equipped with GCA before the bad weather season begins. Units are now operating at Gander, London, Paris, Iceland and Wilmington, Del.

Wright indicated that if Congress was willing to subsidize commercial installations of airborne radar, as the Hinshaw Committee recommended for national defense reasons, that CAA would be glad to discuss such financing with the AAF and Navy. He agreed with the Hinshaw report that installation of both radar airways and the CAA sponsored vhf omnirange systems are not justified. Wright pointed out that the United States and ICAO are already officially on record as favoring the VHF omni-range program.



AID FOR CRIPPLED

Emergency delivery of a 6-ton drive shaft from Moore Drydock Co., Oakland, Cal., to Balboa, Canal Zone, was made recently by a Pan American Airways DC-4 after the car ferry S. S. Joseph R. Parrot broke down en route from the West Coast to Miami, Fla. The shaft, 27 ft. long and 12 in. in diameter, was lashed to a cradle, lifted to staging by a crane, and shunted into the plane's fuselage on rollers.

Air Migration Stirs Economic Problems

Uncertificated airlines flying the New York to San Juan route have been drumming up so much business that they are being accused of contributing to New York City's social and economic problems.

More than 2,000 Puerto Ricans are immigrating to New York City each month, a substantial number by charter and nonscheduled carriers which undercut Pan American Airways fare of $130 one-way. As American citizens, the Puerto Ricans need no passport to enter the U. S. The great majority of them settle in New York Citys crowded East Harlem area, which is now expereiencing a marked crime wave and and growing unemployment.

▶ **One Day's Total**—In one day this month, over 200 Puerto Rican migrants and tourists arrived at or departed from Newark airport by uncertificated airlines. It is estimated that 15 nonscheduled and charter operators make the San Juan run from either Newark or Teterboro.

While DC-S predominate, one carrier, Trans Caribbean Air Cargo Lines, uses a DC-4 and makes the Newark-San Juan run nonstop. During June, Trans Caribbean made eight roundtrip flights on the route, achieving impressive load factors. Average number of southbound passengers on the eight trips was 40 and northbound 42.

With an eye on CAB enforcement of nonscheduled regulations, Trans Caribbean varied its operations with three trips to Rome and two to Athens during June. The carrier flew a total of 1,441 passengers 3,544,83 revenue passenger miles during the month and had gross revenues of $216,956. Trans Caribbean showed considerable expansion this spring, employes increasing from 64 in April to 86 by the end of June.

Other industry developments

• **Air Freight Forwarder Association** the ACR Transport Association has filed a formal complaint with CAB against AFFA members who are "holding themselves out to the public" as indirect cargo carriers. ATA declared that some forwarders accept business from any shipper subject only to the limitation of their facilities. Such activity, ATA stated, falls within operations which CAB requires to have certificates of public convenience and necessity in accordance with the Board's Universal Air Freight investigation decision of 1942.

• **Robinson Airlines,** Ithaca, N. Y., has acquired three DC-3S which will be used on the carrier's intrastate run in conjunction with the present fleet of seven-passenger Beechcraft.

• **Bonanza Air Lines,** Las Vegas, Nev., celebrated its first anniversary this month. Company has flown over a million passenger miles on its intrastate run to Reno.

• **Wayne County Airport,** Detroit, is being promoted as the city's principal cargo terminal by National Airfreight Forwarders. Arrangements have been made with county officials to establish a 24-hour-a-day cargo terminal operation at the field this month.

• **Nationwide Airlines** has started daily intrastate flights between Detroit and Houghton, on Michigan's upper peninsula. Carrier is affiliated with nationwide Air Transport Service, Miami Springs, Fla.

EAL-Delta Argue

Final sessions of oral argument before CAB in the Boston-New York-Atlanta-New Orleans route case were highlighted by a Delta Air Lines charge that Eastern Air Lines in the past has made excessive profits but "recently manipulated itself into the red to keep out competition."

Leslie Craven, Delta attorney, told the Board that Eastern had earned 80 percent on its investment for the 30 months ended May, 1942, and 60 percent for the 12 months ended May, 1945. E. Smythe Gambrell, EAL counsel, said his company had lost $200,000 in June this year and between $600,000 and $700,000 in July, when the load factor dropped close to 50 percent. He added that far from needing another carrier, the Boston-New Orleans route is "dripping with service."

TACA Airways Loses $7,920,406 in 1946

TACA Airways, S. A., Panama—incorporated holding company of TACA Airways System, has reported a consolidated net loss of $7,920,406 during calendar 1946 against a $1,011,953 net loss in 1945. The 1946 deficit includes a $4.230,850 loss on investments.

Last year's consolidated operating revenues were $4,139,597 and operating expenses $7,678,928, leaving an operating loss of $3,539,331. These totals compare with consolidated operating revenues of $2,831,-886 and operating expenses of $3,576,840 in 1945. The company's earned surplus deficit as of Dec. 31, 1946, was $10,007,-881.

TACA'S passenger business last year accounted for $2,114,840 in operating revenues, while freight and express revenue aggregated $1,225,737. Waterman Airlines, subsidiary of Waterman Steamship Corp., acquired management control of the company in January of this year.

"Alpha" Crashes

Three persons were killed and two injured in the crash of American Airlines' radar experimental plane "Alpha" into Bowery Bay shortly after taking off from La-Guardia Field on Aug. 8. Soon after becoming airborne, the DC-3 captain reported losing oil pressure in one engine, and the craft failed to gain the field on the second attempt to make an emergency landing. Both the pilot and co-pilot were killed. The "flying laboratory" reportedly contained more than $100,000 worth of experimental equipment.

IAM Set to Capitalize On CIO Strike At Delta

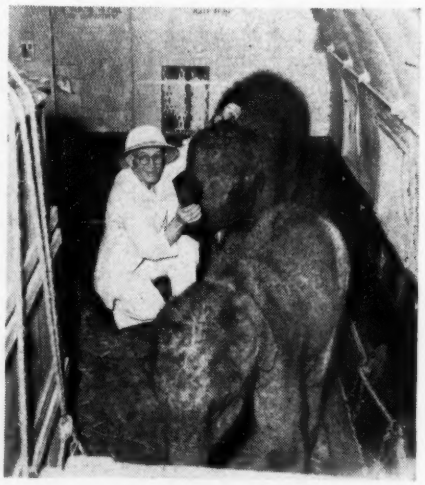
Taking advantage of the tendency toward suicide of airline mechanics' locals of the United Automobile Workers (CIO), the International Association of Machinists is back in the picture again at Delta Air Lines. During the abortive strike the UAW recently staged at Delta, the IAM first withdrew from a representation dispute and has now reinstated its application to participate in a mechanics' election.

Delta President C. E. Woolman reportedly is irked at CIO tactics and has refused to take back the UAW strikers—said to number around 200. Many of the strikers are ready to vote for any union which will regain their jobs for them, and the IAM is preparing to capitalize on the situation. Meanwhile, the National Mediation Board is pondering whether the strikers, said by Delta to have been separated from service, will be allowed to vote if and when a representation election is held.

Lower Rate Increasing Overseas Airmail Volume

Reductions of up to 65 percent in foreign airmail rates last November are continuing to push volume higher, the Post Office Department reports.

Reaching a new peacetime peak of 409,-158 lb. in May of this year, the average monthly mail load transported internationally by air for the six month period January-June, 1947, was 354,525 lb. In comparison, airmail bound overseas in October, 1946, last month of the old rates, totaled 202,438 lb.

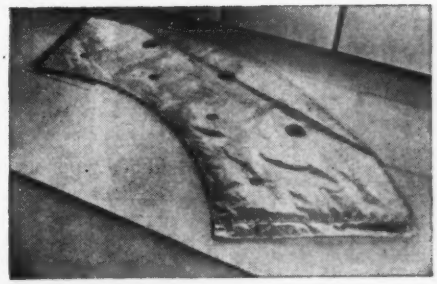


NOAH'S ARK

Together with other inhabitants of Siamese, Indian and Malayan jungles, these two baby elephants recently were flown from Bangkok to California in 60 hours by a Pacific Overseas Airlines DC-4. Also included in the $75,000 cargo were 15 Oriental bears, two leopards, 200 assorted apes and monkeys, 40 pythons, 20 cobras and more than 1,100 rare Oriental birds.

HARNESSES HEAT in the WORLD'S FASTEST ENGINES..

EASY TO APPLY: The J-M Thermoflex Insulation Blanket laces on quickly. Here it is being applied to an engine cone.



CUTOUTS PROVIDED as needed for engine supports, thermocouples and other engine controls.

COMPLETE BLANKET consists of crimped Inconel mesh, amosite fibre, aluminum foil, aluminum screen and Monel screen ends.

J-M Thermoflex Insulation Blanket

THIS NEW BLANKET INSULATION was designed especially for insulating the turbine casings, engine cones and tail pipes of jet-propelled aircraft. It does a two-way job of controlling heat:

1. **It improves thermal efficiency**
2. **It protects adjacent structural members from the intense heat**

The complete Thermoflex blanket...illustrated at the left . . . consists of these four parts: (1) An Inconel knitted mesh, (2) An amosite asbestos fibre mat usually ½" to ¾" thick, (3) An aluminum foil sheet to serve as a protective diaphragm for sealing the blanket from gas or oil penetration, (4) An aluminum screen cloth with Monel screen cloth ends provided with hooks for securely lacing the blanket in place.

This construction gives the J-M Thermoflex Insulation Blanket many important advantages. It is flexible . . . easily applied . . . lightweight . . . has low conductivity . . . is highly heat-resistant . . . and can be supplied with cutouts when required.

For further information write to Johns-Manville, Box 290, New York 16, N. Y.

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Packings and Gaskets • Friction Materials
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Private Pilot Blamed For Delta Accident

The accident in which eight Delta Air Lines officials were killed at Muscogee County Airport, Columbus, Ga., last Apr. 22 probably was the fault of the private pilot whose BT-13 struck the Delta DC-3 as it was preparing to land, a CAB report on the accident states.

The Delta plane was on a route survey flight on a clear morning. It was making a proper final approach to the field at the same time the BT-13 was preparing to land. The pilot of the smaller plane did not see the DC-3 making its final approach and failed to fly a standard left hand traffic pattern around the airport. Instead, without keeping a diligent lookout for other planes, the private pilot made a long shallow right turn southeast of the field onto final approach for landing on the same runway to which the DC-3 was headed.

Upon completing its turn, the BT-13 was almost directly above the DC-3 and remained in that position during the remaining course of the landing approach, finally striking the Delta plane's empennage when the transport was 10 ft. above the runway. The BT-13 remained lodged in the tail surfaces of the DC-3 as it zoomed to 150 ft. and then crashed to the ground and burned. All occupants of the two planes were killed, including George Cushing, Delta's vice president-operations, who was pilot of the DC-3.

Spanish Plans Told

The Spanish airline Iberia (Compania Mercantil Anonima de Lineas Aereas) probably will use American equipment for its contemplated trans-Atlantic service to the U. S., according to the carrier's president, Rubio Paz.

CAB SCHEDULE

Aug. 28. Prehearing conference on TACA., S.A., applications for foreign air carrier permit extensions and amendments. Dockets 3016 and 3017.)

Sept. 2. Hearing in Latin American Certificate Amendment cases of Panagra and Braniff. (Dockets 2527 and 2622.)

Sept. 3. Prehearing conference on Boston-Bermuda service applications by Northeast Airlines, Pan American Airways and Colonial Airlines. (Dockets 1650, 2912 and 3052.)

Sept. 8. Hearing on Mid-Continent's proposed service between Minot, N. D., and Regina, Saskatchewan. (Docket 628.)

Sept. 8. Hearing in Chicago Helicopter Service case. Extended from Aug. 18. (Docket 2384.)

Sept. 8. Hearing in case involving additional service in California-Nevada area. Postponed from Aug. 25. (Docket 2109 et al.)

Sept. 10. Hearing on CAB's investigation of TWA-Hughes Tool Co. realtionships. (Docket 2796.)

Sept. 29. Hearing on Mid-Continent's application for alternate Kansas City-New Orleans Route. (Docket 1956.)

Oct. 7. Hearing involving additional Florida Area Service. Postponed from Aug. 12. (Docket 1668 et al.)

Oct. 20. Hearing on Pan American Airways' application for route consolidations and extensions in Latin America. Postponed from Sept. 2. (Docket 2811.)

Nov. 15. Hearings on Board's investigation of Consolidated Airfreight Tariff Agreement. (Docket 2719.)

Play-by-Play

Visitors to the La Guardia airport observation deck will hear play-by-play Port of New York Authority announcements over a public address system describing varying activities at the field on Saturdays, Sundays and holidays from 3 to 7 P.M. Recent trial programs have been so favorably received by the public that the Port Authority has made the broadcasts a permanent feature of its airport service.

Victor H. Barden, the La Guardia information announcer and former control tower chief, translates for the spectators the radio instructions the tower is giving pilots on the field or aloft. He also reports on the origin and destination of flights and types and capacities of planes.

Franklin to Take Oak Ridge Post

John C. Franklin, TWA's vice president in charge of engineering, has resigned to become manager of the Atomic Energy Commission's Oak Ridge-directed operations.

Active in air transportation since 1929, Franklin joined TWA in 1931 as superintendent of communications. He became vice president-engineering in 1942. With the Atomic Energy Commission, Franklin will administer plants at Oak Ridge which separate U-235 and the Clinton laboratories, which produce radioisotopes. The Oak Ridge, Tenn., office is to be activated Sept. 15.

Other personnel developments:

• **Air Transport Association**—Dr. R. V. Hobbah, former research economist with ATA, has been named chairman of the newly-established department of transport of the School of Business Administration at Rutgers University's Newark, N. J., colleges.

• **All American Aviation**—Ernest H. Kingsbury, former assistant to AAA'S chief engineer, research and developmental department, has become technical advisor to Flight Safety, Inc., Philadelphia.

• **American**—D. L. Bogart has been appointed cargo sales supervisor for the New York district.

• **Irish Airlines**—Warren H. Smith, formerly general sales manager of Northeast Airlines, has become New England district superintendent for the Irish carrier, which plans to inaugurate trans-Atlantic service early next year.

• **Pan American**—Jasper N. Barnette, Jr., superintendent of schedules for PAA'S Latin American division in Miami, has become assistant to vice president Erwin L. Balluder, with headquarters in New York.

74 New Michigan Markers

Seventy-four Michigan communities have been air-marked in the current construction season, Walter J. Carr, air navigation specialist of the Michigan aeronautics department, reports, bringing the state's postwar airmarking total to 260 towns.

Discounts Help PAA Boost Spring Traffic

Pan American Airways has reported a systemwide traffic increase in the second quarter of 1947 which boosted revenue passenger mileage sharply above levels shown for the first quarter of the year and the second quarter of 1946. Plane miles flown also rose markedly.

Revenue passenger miles during the second quarter of 1947 aggregated 446,252,000, against 343,538,000 in the first quarter of 1947 and 280,183,101 in the second quarter of 1946. Plane miles flown increased from 22,524,638 in second quarter 1946 to 23,554,665 in first quarter 1947 and 25,139,041 in second quarter 1947.

The 20 percent vacation discount to Latin America effective May 1 has been helpful in raising traffic levels in that area, particularly on the long haul, according to PAA officials. Increases were especially noticeable on New York-Rio De Janeiro and Miami to Buenos Aires, Panama and Mexico City runs. Traffic on shorthaul trips between Miami and Havana and Miami and Nassau, neither of which was included in the summer fare discount, remained substantially the same.

Air Cargo, Inc., Opens Detroit Freight Terminal

First consolidated airfreight terminal for handling shipments over the certificated airlines was placed in operation this month by Air Cargo, Inc., at Detroit's Willow Run Airport.

The terminal has about 5,000 sq. ft. of floor space in a hangar. Similar units are planned by Air Cargo, Inc., the certificated airlines' ground service organization, in other key cities where growing cargo volume justifies the setup.

Meanwhile, Air Cargo, Inc., announced establishment of a regional office in San Francisco under J. P. Houghton, formerly with Eastern air lines and United Air Lines. Until other regional offices are established, Houghton's territory will comprise the entire area west of the Mississippi.

CAB ACTION

The Civil Aeronautics Board:

• Granted Northwest Airlines temporary exemption permitting service at Okinawa as intermediate point between Shanghai and Manila; and granted Pan American Airways temporary exemption permitting operations between Guam and Shanghai via Okinawa (Dockets 2985 and 2962).

• Denied Alaska Airlines' request for temporary exemption authorizing cargo service between Anchorage, Alaska, and Seattle Docket (3001).

• Authorized Panagra to suspend service temporarily at Mendoza and Cordoba, Argentina, as intermediate points between Santiago, Chile, and Buenos Aires.

• Approved transfer to Pacific Northern Airlines of Woodley Airways' certificate of public convenience and necessity (Docket 2022).

Airmail Rate Boost Remains in Prospect

Post Office request for more funds may spark action next session of Congress.

A shortage of $16,795,000 in the Post Office Department's fiscal 1948 budget to meet estimated domestic and foreign airmail obligations of $104,295,000 (AVIATION WEEK, July 28) is expected to necessitate a request for additional funds from Congress next year, sparking off renewed demands for increased airmail postage rates.

In granting additional funds, members of the House and Senate Appropriations Committees, led by Sen. Clyde Reed (R., Kans.), intend to demand the rate increase. During the past session, a bill raising airmail and other postal rates was reported out of the Post Office Committee but failed to obtain Rules Committee clearance for floor action, primarily because of a surge of opposition boosting newspaper postal rates. The legislation was sponsored by Chairman Edward Rees (R., Kans.) of the House Post Office Committee at the request of Reed and other members of the Appropriations Committees.

▶ **Revenues Decline**—A report by the Post Office Department, showing that postal revenues declined when the eight cents per ounce rate was reduced to five cents last October, will be used by the Appropriations committeemen to buttress their demands for the airmail rate increase. The report discloses that:

• **Total airmail revenue** of the Post Office dropped from $14,662,864 for the quarter ended Sept. 30, 1946, when the eight cent rate was in effect, to $13,659,845, for the quarter ending Dec. 31, when the five cent rate was in effect.

• **Airmail volume** increased from 156,454,783 pieces during the third quarter to 214,219,322 pieces during the fourth quarter, but the Department's revenue per piece of mail handled declined from 9.372 cents to 6.377 cents.

▶ **Estimates Made**—In the first quarter of 1947, airmail volume fell off, and the postal revenue dropped to $12,629,222, or 6.417 cents per piece of mail handled. Tentative estimates are that the postal revenue from airmail during the second quarter of this year will amount to $12,710,482—slightly more than the revenue for the first quarter but below the level during the period when the eight cent rate was in effect.

The Post Office Department estimates airmail obligations during the current fiscal year of $51,295,000 for domestic services (compared with $34,000,000 during the 1947 fiscal year) and $53,000,000 for foreign services (compared with payments of $27,262,000 last year). This year's anticipated foreign service obligations are allocated $30,640,000 for Latin American and trans-Atlantic operations and $22,360,000 for Alaskan and Pacific operations.

▶ **Supplemental Request**—The regular 1948 fiscal year Post Office supply bill allocated $37,000,000 for domestic airmail) and a token $5,500,000 for foreign airmail (provided before permanent rates on overseas routes had been set by CAB). A supplemental request of $14,295,000 for domestic services—primarily required to meet anticipated increases in payment rates to carriers—and $47,500,000 for foreign services was trimmed by Congress in its closing days to $10,000,000 for domestic services and $35,000,000 for foreign services.

All American Denied Passenger Service

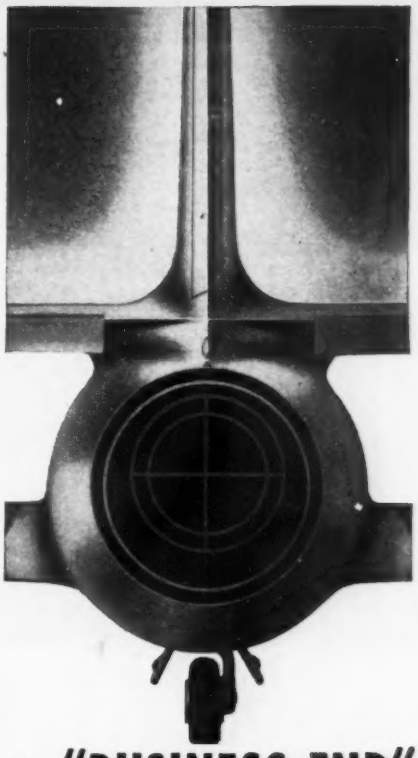
Weighing safety considerations against the advantages of a new experiment in scheduled air transportation, CAB has turned down All American Aviation's request for temporary authority to carry passengers on a segment of its mail and property pick-up routes.

In making its decision, the Board recognized that All American had shown "commendable initiative and energy' in conducting experiments with the combined operation. But it added that the development had not reached the state where adequate assurance can be given that the high standards of safety requisite to all scheduled air transportation of passengers will be preserved.

▶ **Beechcraft Used**—All American had proposed using modified Beech D-18C aircraft for combination passenger and pick-up service on a 333-mile link between Pittsburgh, Pa., and Huntington, W. Va. The carrier has converted two of the eight-passenger Beechcraft by installing pick-up gear and mail bins in the area occupied by the four front seats.

While not contending that the converted D-18C is economical for the operation, All American has told CA that the plane is the best equipment now available. AAA said its experience in conducting demonstration runs and favorable passenger reaction to such flights had been convincing that the Beechcraft is sound and adequate for such service.

▶ **CAB Defines Position**—CAB noted that the D-18 has not been certificated by CAA for combination service such as proposed by All American. The Board said it has authorized services in the past which were experimental in their economic aspects, but also pointed out that it consistently has taken the position that it would be contrary to the public interest to authorize experiments where passenger safety is directly involved. "The type operation contemplated by All American requires frequent descents to low altitudes for property and mail pickups, which would expose passengers to hazards which do not attend the flight of conventional aircraft,' CAB concluded.



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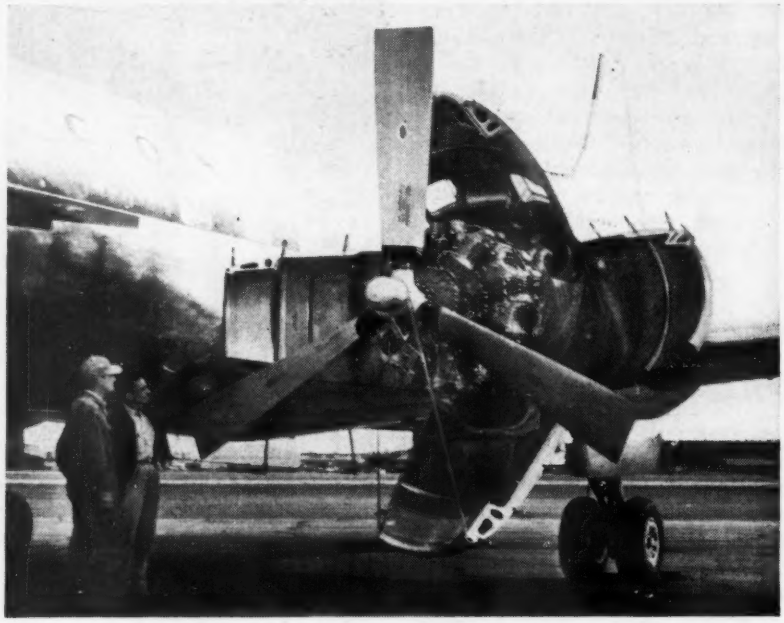


CONVAIR 240 WIDE OPEN NACELLE

New view of "orange-peel" nacelle of Consolidated Vultee's twin-engine transport, showing how deep engine is exposed by four-piece enclosure for inspection and line maintenance. Note exhaust ejector stacks near top of engine.

Largest Feederline To Start Service

Trans-Texas airways plans initial flights to eight points this month.

Second anniversary of Pioneer Air Lines' inauguration of the first certificated feeder service has found the nation's eighth short-haul carrier in the process of activation.

Like pioneer, which as Essair, Inc., started flights between Houston and Amarillo in August, 1945, the new carrier, Trans-Texas Airways, will operate routes entirely within Texas. As shown in the accompanying table, Trans-Texas is the largest feeder set up by CAB. Its system of 1,824 route miles is nearly four times as large as that of the smallest feeder, Florida Airways, which has only 476 route miles.

▶ **Initial Service**—TTA has asked CAB authorization to inaugurate DC-3 service this month to Ft. Worth, Dallas, Palestine, Houston, Victoria, San Antonio, Brownwood and San Angelo, but first flights may be delayed until September. The Houston-based carrier (certificated last November as Aviation Enterprises, Inc.) later will fly as far west as El Paso and south to Brownsville.

Meanwhile, complete statistics on the 15 feeders either certificated or designated for certification when adequate airports become available, show that CAB already has laid out 19,099 miles of short-haul routes. Of the 340 points placed on feeder links, 216 had not previously been granted scheduled airline service.

Average population of points on the short-haul routes—84,123—is considerably smaller than the average population of points on certificated trunklines. Bulk of the 216 points which will receive their first certificated airline service from feeders have less than 20,000 population.

▶ **Most Stops**—Wisconsin Central Airlines has the most stops on its routes, 34, of which 27 had not previously been designated for certificated airline service. Florida Airways, the smallest short-haul operator, has been certificated to only 10 points in the state.

Parks Air Transport, East St. Louis, Ill., has been designated to serve towns with the largest aggregate population—5,827,283. By contrast, the 15 points in Oregon, Washington and Idaho to which Empire Air Lines has been certificated have a combined population of only 282,776.

Average distance between feeder stops is only 55.5 miles. Summit Airways has the longest average hop, 101 miles, on its Rocky Mountain links, while Wiggins Airways, Norwood, Mass., has the shortest average hop, 27.4 miles.

Cargolines File

Six more uncertificated carriers have applied to CAB for letters of registration granting rights to haul cargo on a common carrier basis pending determination of their route applications. The total is now 23. Latest to file are Eagle Air Freight, Burbank, Cal.; The Flying Tiger Line, Burbank; Riddle Aviation Co., Coral Gables, Fla.; Mercury Airlines, Port Columbus, O.; Standard Airlines, Long Beach, Cal.; and Pacific Overseas Airlines, Ontario, Cal.

SHORTLINES

▶ **Air France**—Expected to begin occupancy of its 13-story building at 683 Fifth Ave., New York, last week.

▶ **American**—Flew 63,156 passengers out of New York on domestic flights during July, British civilians pulling out of India.

▶ **BOAC**—Has added two extra schedules per week between the United Kingdom and Carachi to meet the heavy demand from against 59,450 in June.

▶ **Capital**—Recently signed a new agreement with the International Association of Machinists increasing mechanics' wages 15 cents an hour, providing for seven paid holidays, liberalized vacations, paid sick leave and an apprentice program. The union said about 700 employes covered by the pact would gain $385,000 during the coming year. Contract gives mechanics $1.71 an hour; inspectors and lead mechanics $1.89; lead inspectors $1.95; ground service workers $1.14; and maintenance helpers $1.24.

▶ **Eastern**—Has established a pension plan for all employes with three or more years' service. Effective Oct. 1, the plan calls for retirement of employes at 65, with the exception of pilots, who will receive the program's benefits at 60. The pension fund will be built by company and employe contributions.

▶ **National**—Expects delivery on its third DC-6 late this month. . . . Company has increased its mechanical force by almost 125 since the first DC-6 was delivered in June.

▶ **Pan American**—Last week was scheduled to make a proving flight over a new Pacific link from San Francisco to Honolulu, Wake Island, Tokyo, Shanghai, Hong Kong, and Bangkok, with regular weekly service planned next month if CAA approval is granted. When the service is inaugurated, it will replace the present route to Shanghai via Guam and Okinawa. It will also supplement PAA's route to Bangkok and Calcutta via Guam and Manila.

▶ **Piedmont Aviation**—Has become the 34th member of the Air Transport Association. The feeder, based at Winston-Salem, N. C., hopes to begin operations on some segments of its routes before fall.

▶ **Sabena**—Expects to place DC-6 equipment with sleeping berths on its trans-Atlantic run next month.

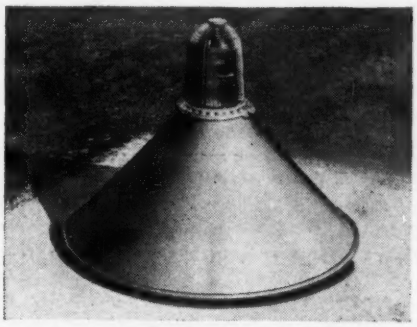
▶ **Trans-Canada**—During a recent month's survey found that 56 percent of its passengers from London to Montreal and 52 percent of its Montreal to London travelers were women. . . . TCA carried 39,559 passengers on its entire system in June, against 38,110 in May.

▶ **United**—Is operating a record 200,000 plane miles daily compared with a pre war high of 81,000 miles daily in 1941. . . . Carrier is using 22 of its projected fleet of 35 DC-6s. Total planes on hand 121.

NEW AVIATION PRODUCTS

Raised Marker Lights

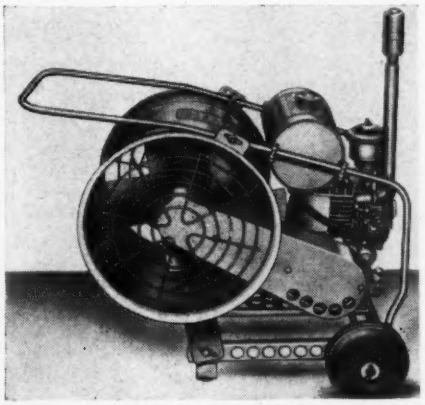
Elevated runway, strip, and taxiway marker lights, designed to meet latest CAA specifications L-802 for conversion of semi-flush contact lights, are in production at **American Gas Accumulator Co.**, 1029 Newark Ave., Elizabeth, N. J. Greatly increased



visibility over conventional semi-flush unit is reported. Full data is available from maker in relating to specifications and prospective installations. Distribution has been arranged through General Electric Co., Schenectady, N. Y.

Portable Two-Way Ventilator

Lightweight high-capacity portable ventilator, introduced by **The Herman Nelson Corp.**, Moline, Ill., is designed to solve ventilating and cooling problems encountered in welding booths, paint spray booths, field repair shops, and hangars. Use is also seen in airplane ventilation. Unit, mounted on light metal frame equipped with rubber-



tired wheels, can be powered by either gasoline engine or electric motor. Standard equipment includes one 14 in. dia. by 16 ft. length extensible canvas duct for conveying air to desired point. Two-way air flow permits drawing smoke, dust, or gases from area or supplying fresh cooling air. Duct is specially treated for flame and moisture resistance.

Handy Kit for Float Repairs

Stop-A-Leak kit for seaplanes and amphibians is announced by **Wiggins Airways**, Metropolitan Airport, Norwood, Mass. Intended for use in emergency repairs of floats and hulls while away from regular repair facilities, outfit consists of adhesive in stick form for minor leaks including loose rivets, special adhesive to be heated in can for making major repairs, stiff-bristle brush for applying adhesive, and duck cloth patches of various sizes for use in the major repairs. Made up in small, 1½-lb. watertight package, kit may be slipped through hand-hole of a float for stowage inside until needed.

Offers Two Anti-Rust Compounds

Two preservatives for normal rust prevention in the commercial and private aircraft fields are announced by **Shell Oil Co.**, 50 W. 50th St., N. Y. C. 20. One is general purpose oil which gives approximately 200-day protection to parts stored indoors where rust conditions are moderate. Second is preservative to protect parts during long-term storage. This may also be used for external fittings of seaplanes and for control cables and similar applications within airframe. Application of compounds is by spraying, dipping, or brushing.

Information Tips

Templets Speed Dial Drawing

Drafting templets to simplify task of drawing dial indicators are being mailed to tool designers, draftsmen, and tracers by **B. C. Ames Co.**, Waltham 54, Mass. Printed on two 8½ in. by 11 in. Bristol cards, templets give three-views of four sizes of dial indicators. Depicted are: Six dial graduations for each size, eliminating necessity for dividing-off dial markings; four popular backs (center and offset lugs, adjustable post, and screw type); and also five most-used types of contact points. Templet is merely slipped under drafting paper, then indicator and details are traced in without resorting to use of scale or dividers.

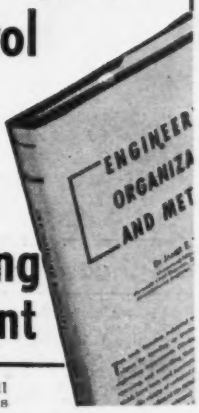
Announces New Loran

Seaguide, a simplified Loran instrument to be available late this year or early in 1948 from **Industrial Radio Div., Philco Corp.**, Philadelphia 4, Pa., is new semi-automatic aid to avigation for use on trans-ocean planes. Folder and literature issued by company states how instrument will give position of plane in seconds instead of minutes. Weighing 35 lb., instrument is 15 x 15 x 10-in. direct-reading unit designed to receive signals from Loran shore transmitters at ranges up to about 1,400 nautical miles at night and approximately 750 nautical miles during the day. Innovation is reception on six frequency channels—four for present HF Loran shore stations, and two LF channels for the new long-range transmitters now being developed by Government. Seaguide has two mechanical counters to indicate position of plane. Another feature is automatic frequency control (AFC) circuit permitting operator to line up signals without manual crystal phasing. Latter control, however, is retained in unit for emergency operation.

Roughness Measurement Detailed

Surface roughness measurement is subject matter of illustrated bulletin from **Physicists Research Co.**, 321 S. Main St., Ann Arbor, Mich. Giving suggestions on establishing a specification and control system, literature explains how Profilometer is used (1) to obtain positive check on roughness specifications in definite microinch units over any desired length of surface, (2) to shorten or eliminate production operations, (3) to detect impending dimensional errors before they occur, (4) to permit more accurate dimensional control, and (5) to obtain a more consistent finish from cutting tools.

How to organize, operate and control a product-design engineering department



Here is a book that will show you tested methods to facilitate production and reduce costs in your engineering department. Designed to minimize paperwork without sacrificing control, this book outlines the basic functions necessary to all successful engineering departments, large and small. These fundamentals are discussed in full to clearly point the way to smoother operation, higher production and greater economy in your organization.

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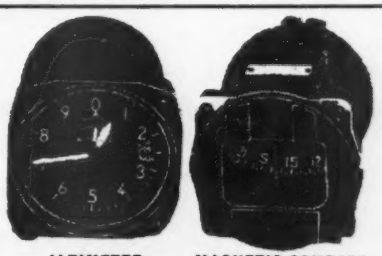

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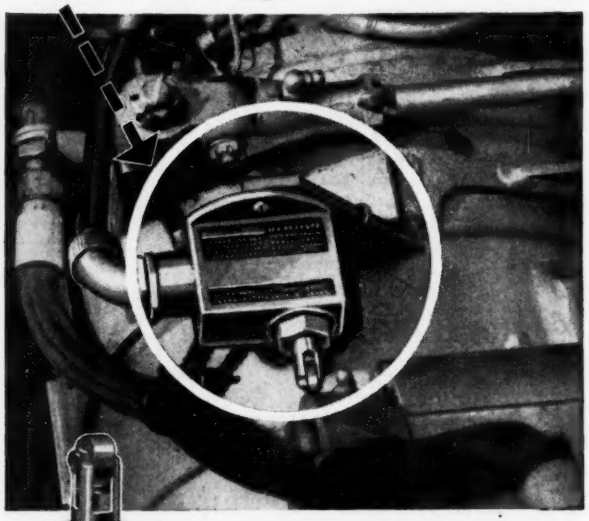

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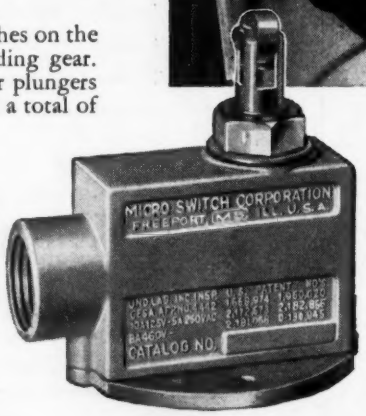

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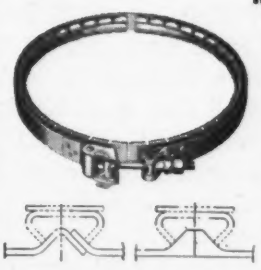

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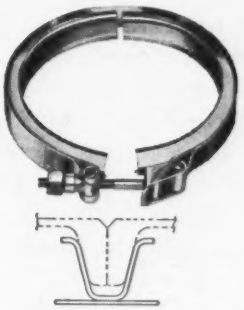

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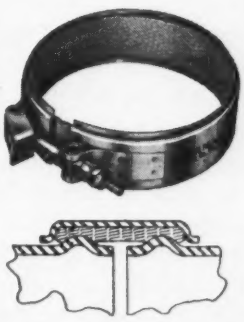

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EDITORIAL

Keeping CAA Inspectors in Line

CAA inspectors who insist on mistreating the public are in for trouble. The United Pilots and Mechanics Association in Washington has announced it is starting a master file on every inspector "and certain other key personnel" to keep tab on their conduct.

In its latest news letters UPMA announces the plan to its thousands of members, who live in all 48 states:

"During the past three years we have received many complaints against actions of CAA inspectors in the field. Some were justified. Some were not. But in the cases which were justified a straightening out of the immediate complaint was all that could be done. CAA found that these inspectors did not have any other complaints in their personnel files, though it is known that in some cases numerous complaints have been lodged against some inspectors.

"Those inspectors need more than a light reprimand. They should be demoted or removed. But their personnel files are bare."

It is the contention of the top authorities in CAA that they are powerless to remove employes of civil service standing unless certain grave charges can be proved. One key to the problem is the rating system. An inspector in the old guard circle has friends in the right places. He can usually be assured that there will be nothing but favorable ratings filed in the first place, or that unfavorable ones will "disappear" from the files. This may sound rather theatrical to the naive and unsuspecting public but it is common practice in some offices in CAA.

However, UPMA believes that hereafter, when occasion arises to challenge an inspector's actions, "we will be able to cite instances without revealing the source of information and thus help CAA cut out the deadwood in its organization, under civil service rules."

A minority of inspectors have aroused public complaints. It would be unfair to criticize the majority. The minority, however, know very well who they are. In the past the suffering public has been at their mercy. There were too many subtle but extremely effective methods of revenge on any poor individual who dared to complain about inspector treatment. The CAA old guard are past masters at spite work, but never on paper. The slow down treatment is a favorite. Certifications strangely fail to clear or renewals become "lost," applications are held somewhere because the victim made technical errors in filling them out. Or there are numerous repeat examinations between long intervals because the individual doesn't quite satisfy the inspector. The old game works as effective on fixed base operators as on the unsuspecting pilot. Here, however, the stakes are larger and it pays the operator to do a certain amount of business "entertaining" or gift buying, in one form or another. The operators who meet these obligations seem to have least difficulty with CAA. The small operators with least money to expend frequently seem to have most difficulty.

The inspector problem last hit the headlines in 1944, when two editorials in AVIATION NEWS brought a national investigation by the then new Administrator of Civil Aeronautics, T. P. Wright. Mr. Wright sent copies of the editorials to every regional office of CAA, with instructions for each inspector to comment as he saw fit. Later, a definite effort was made by Mr. Wright to instruct inspectors in certain aspects of public relations. There was a noticeable decline in complaints as sincere personnel sought honestly to improve their service to the public, and the unreconstructed FBI-type inspectors waited for the heat to go off.

Recently, complaints have been heard again, and with certain discouraging signs of a return to power of the old guard factions in CAA, we feel the UPMA nation-wide file is as well timed as it is ingenious. We hope that fixed base operators, pilots, mechanics and plane owners will take advantage of this opportunity to weed out obnoxious and incompetent inspectors. For the first time, the public has an opportunity to report such personnel without fear of reprisals, for all names of complainants will be kept confidential by the association.

UPMA has the largest fixed base operator membership of any group in the country. Furthermore, thousands more of its members are plane owners, pilots and mechanics. We shall await the public response to this innovation with keen interest. Conscientious inspectors have nothing to worry about. The others must look ahead to uncomfortable nights as they wonder which of their victims are writing complete reports to an independent association office in Washington. For once the worm has turned.

It seems to us that it would be a public service after six months for UPMA to release the names of the inspectors responsible for the largest number of complaints. If UPMA sees fit to issue the results of this unpopularity poll, AVIATION WEEK will print them.

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AVIATION WEEK

AUG. 25, 1947

INCORPORATING AVIATION AND AVIATION NEWS

A McGRAW-HILL PUBLICATION

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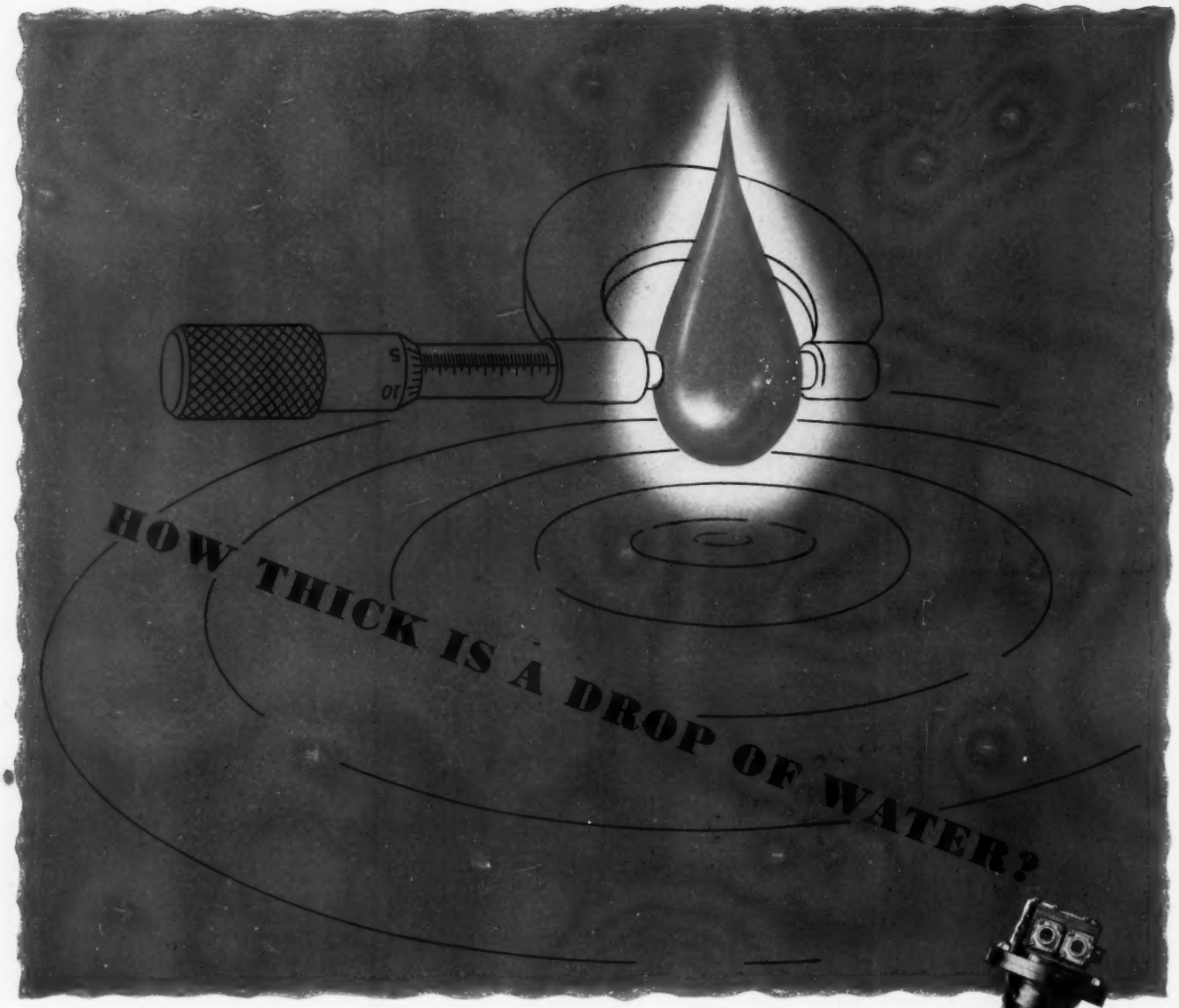

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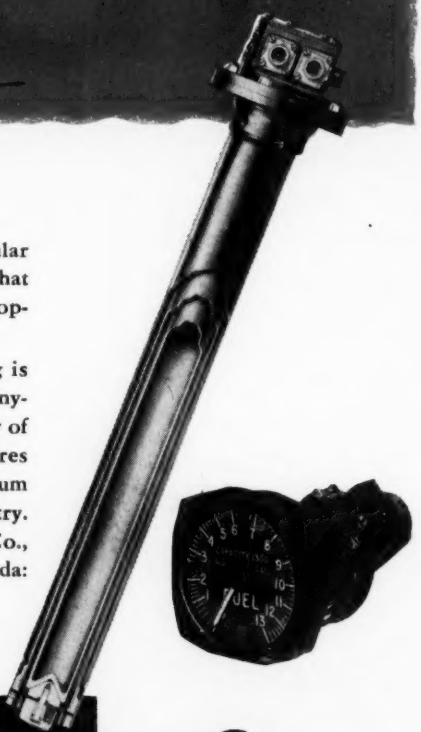

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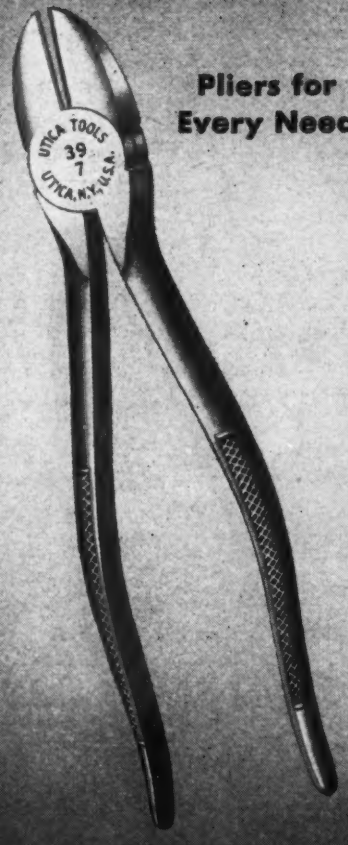

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Vol. 47 No. 8

AVIATION WEEK

Aug. 25, 1947

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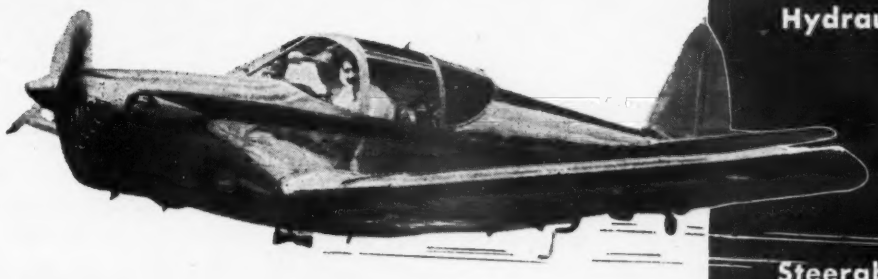

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THE AVIATION WEEK

BACK TO WORK—The hard task of framing a long-range National Air Policy and shaping of the autonomous Air Force has begun in earnest.

After the divertisement offered by the Hughes investigation, both government and industry aviation officials are back at hard, gruelling work.

Two seemingly separate events last week had, actually, a very close relation. One was the publication of the statement of air policy by the Air Coordinating Committee. The other was a meeting by AAF brass to begin allocation of procurement funds and contract authorizations made available for fiscal 1948. By Sept. 15, it is expected that all allocations will be made and will involve approximately 800 planes. But that still leaves major policy matters undetermined. That is where AAF's troubles become part of the air policy picture.

TOOL FOR THE JOB—The ACC statement has a background of more than two years. In 1945, the Committee issued a lengthy analysis of the state of aviation as it was left by the end of the war. This included recommendations for Congress and the Executive branches.

Last December, ACC began to re-examine our national air policy as it had been forged by both Congress and the Executive Departments since the 1945 recommendations. Even at that time, it was apparent that there would be either a Congressional or Executive Air Policy Board set up before the year was out.

Purpose of ACC's policy study was merely to give such a group a basic working document from which it could determine just what our existing national air policy is.

Understanding of that is essential to an understanding of the document released last week.

SOMETHING OLD, SOMETHING NEW—Statement as it came out pleased insiders, perhaps left others cold for it is not a startling disclosure. Several points it makes are new.

MOST ARE OLD—Only because the statement is an informational document designed to tell five men who have not recently been close to the Government aviation picture just what the score is now.

ONE OF THE NEW POINTS—And new only because it is set down on paper officially for the first time although it has been discussed previously—is that there should be provision for a long-range military aircraft procurement program. This furnishes the link to the AAF discussions of last week.

NON-CONSTITUTIONAL STATUS—AAF has long wanted to plan for long-range procurement. The Constitution provides that Army money shall be available for expenditure for only two years. Neither the AAF nor the industry has been able to think of any method—short of the involved amending procedure—to plan long-range procurement in face of the Constitutional prohibition.

Now a way is presented. The Constitution says nothing about the U. S. Air Force which shortly will come into being. Presumably, USAF can budget for long-term buying. Obtaining Congressional acquiescence may be another matter. There is no Constitutional bar on time for spending Navy funds, but Congress has always written one into Naval appropriation bills. Here is where the forthcoming Congressional air policy study may produce interesting developments.

WAIT-AND-SEE—While reserving its main attention for the Air Policy situation, the industry is attempting to assess the merits and abilities of the new Assistant Secretary of Commerce for Aeronautics, John R. Alison.

Most skeptical observers, aware only of his publicized background as a fighter pilot, wonder if he will demonstrate the other qualities necessary in a top civil aviation-policy-maker.

This natural skepticism is tinged with sympathy for a man in a hot spot.

Alison is giving every indication of approaching his problem with wisdom and caution. Abrupt or immediate changes in CAA—his biggest aviation charge—cannot be expected. He is studying CAA and other agencies under his wing carefully. His natural inclination is not to move until he's sure of his ground.

LANDIS AS OPTIMIST—Discussion in ACC's report on International Air Transport appears closely akin to repeated expressions by CAB Chairman Landis that our transatlantic carriers may end this year with a profit even without considering mail pay. While hoping this will come to pass, transport analysts do not go along with Landis.

They point out transatlantic air traffic is falling off and percentage of traffic is going to foreign carriers.

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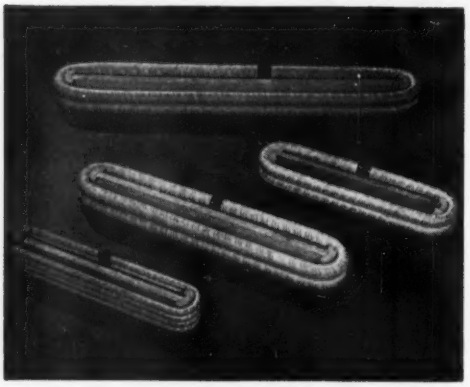

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LETTERS

To the Editor:

A considerable number of people have called to my attention your editorial in the August 11 issue of AVIATION WEEK concerning "official denials."

In this editorial you refer to Mr. John Collings, Vice President-Transportation of TWA, stating in part:

"The official (Mr. Collings) told company employees that such reports (of a TWA-Pan American consolidation) were 'erroneous and irresponsible' and 'without authentic foundation!' We have decided since that Mr. John Collings may not have known who Mr. Hughes talked with. In which case Mr. Collings may have been sincere. But it does seem to show that companies which issue strong official denials of news stories later proved correct are hoodwinking the public and making it more difficult for anyone to believe honest denials thereafter."

In some quarters, the qualifying phrases "may have been sincere," were construed as questioning the integrity and veracity of Mr. Collings. Further, that he was being accused, inferentially, if in no other way, of "hoodwinking the public" by issuing an "erroneous" official denial.

I cannot state too strongly that when Mr. Collings issued his statement of denial (March 5, 1947), he acted with complete honesty. There is no question of his being sincere. He acted then, as he has always acted, with honesty and integrity.

To eliminate any question and any doubt in the minds of those who construed your editorial to question Mr. Collings' sincerity, I hope you will make clear in a forthcoming editorial that such was not your intent.

Dale Armstrong
Vice President—Public Relations, TWA

(Editor's Note—We have been informed to our satisfaction that Mr. Collings' statement was issued only after he was incorrectly informed by someone in the Hughes organization that the AVIATION NEWS *story was without foundation).*

NEWS DIGEST

Aviation Maintenance Corp. reports net profit of $131,481 for the twelve months ending April 30, equal to 26 cents per share.

Cuban Government reported to have purchased 12 North American B-25 medium bombers from U. S. surplus with 4 already delivered. Major F. E. Roth, Morrison Field, Florida, Adjutant, says he understands there are "a lot more planes to come." State Department denies knowledge of transaction.

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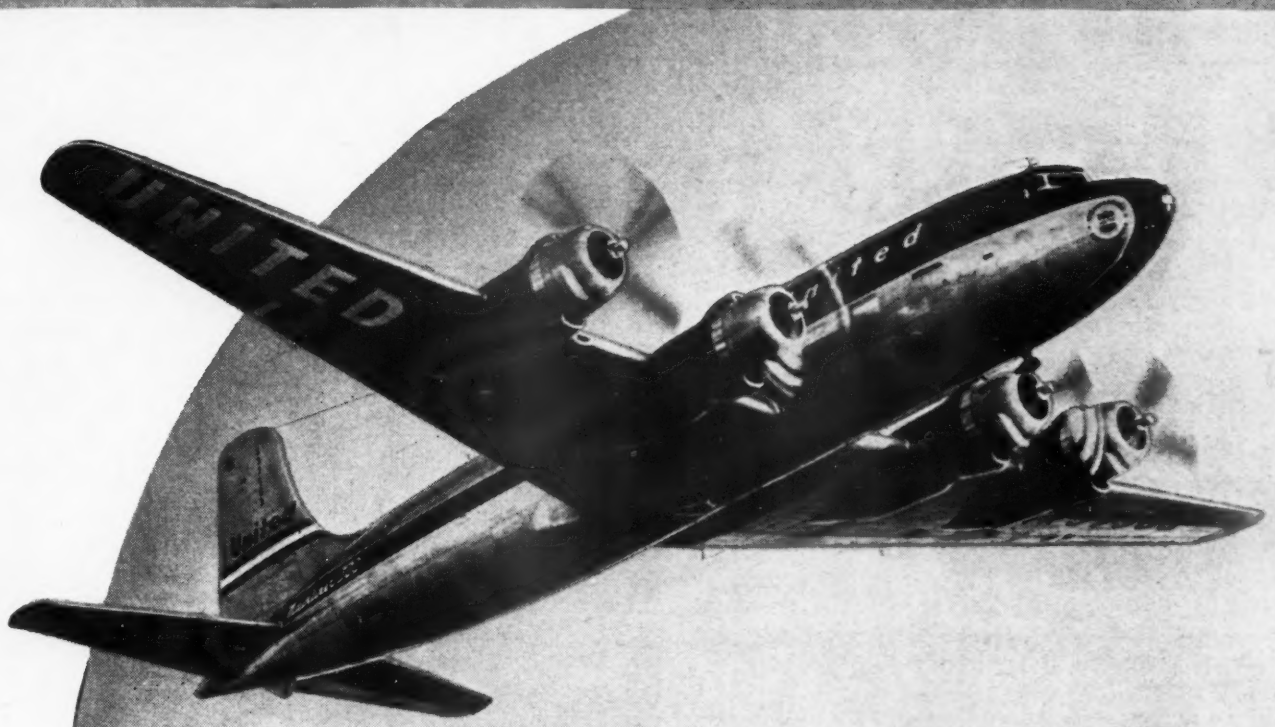

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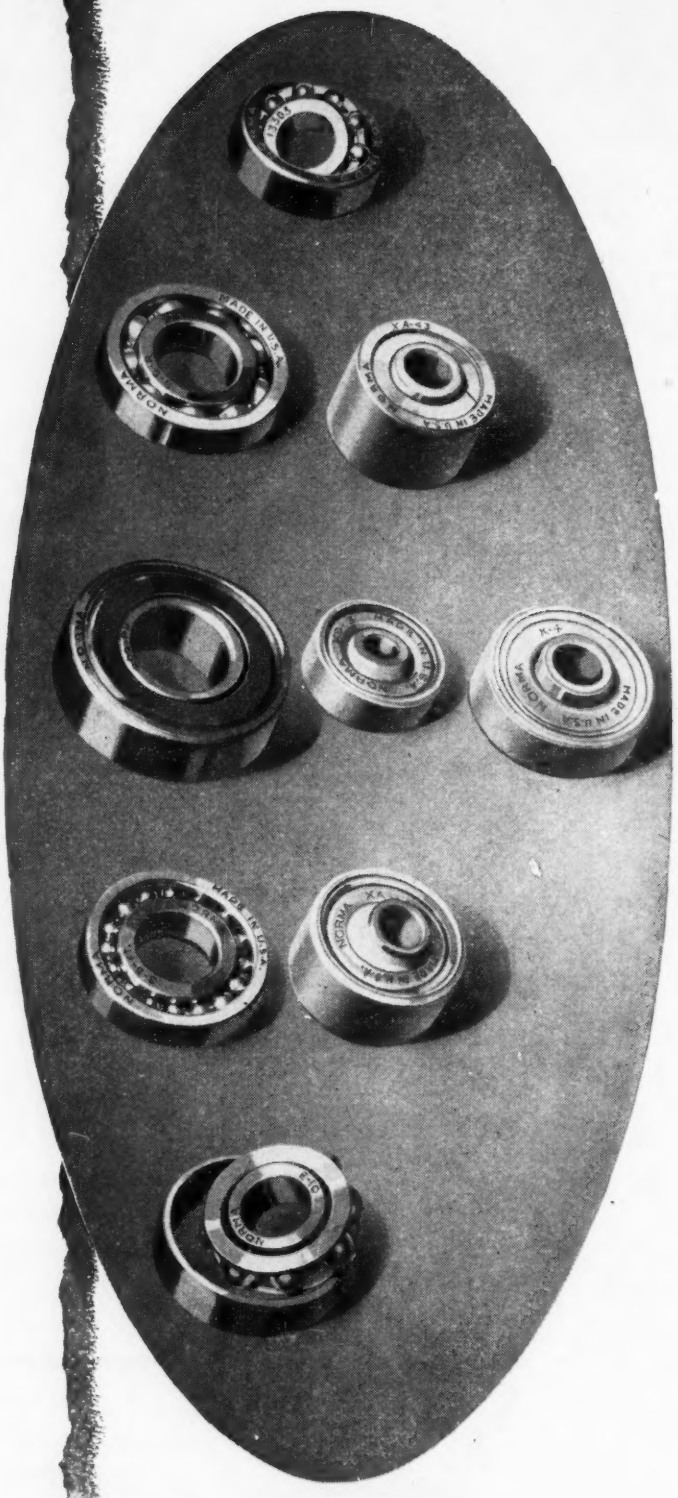

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VOL. 47 • NO. 8

AVIATION WEEK

AUGUST 25, 1947

INCORPORATING AVIATION AND AVIATION NEWS

New ACC Report Urges Long Range Plane Buying Program

Need for freedom from budget restrictions emphasized; reduced costs, stable industry, stronger Air Force seen as result.

By WILLIAM KROGER

Armed with a new statement of the Government's position with respect to all aspects of aviation, the President's Air Policy Commission last week was completing staff appointments and scheduling procedures that point to an early start of hearings; some public, some private.

The Air Policy statement was prepared by the Air Coordinating Committee for the President and transmitted by him to the Commission as one of its basic working tools in its overall assessment of national air policy (AVIATION WEEK, July 28).

▶ **Outline Principles**—Rather than being specific recommendations, the ACC statement comprises a series of principles that have been developed through months of idea-swapping on high Government and industry levels. It was designed to furnish the Air Policy Commission with a reference paper on which it could judge whether the administration is pursuing the best possible course in handling aviation matters.

▶ **The Full Commission**—Thomas K. Finletter, Chairman, George P. Baker, Vice Chairman, Arthur D. Whiteside, E. Palmer Hoyt and Henry Ford II—held two meetings last week at which the ACC report presumably was discussed. To aid S. Paul Johnston as Executive Director, the Commission appointed Charles H. Colvin as specialist on industry relations, Edward S. Prentiss to study air transportation and private flying, and Richard F. Cook to study government relations and government procedures. Colvin is an aviation consultant, and Prentiss and Cook were both borrowed from the State Department. Other staff appointments were expected before the week end.

▶ **Four Categories**—The ACC statement that the Commission will use is divided into four broad categories: civil aviation, military aviation, aircraft manufacturing, and advancement of the aeronautical sciences. Importance of the assertions in the report is that they are presented as existing policy, not as recommendations for the future. And in each of the first three categories—civil aviation, military, and manufacturing—there are significant reflections of current Government thinking.

Primary point on aircraft manufacturing is that there exists a need for a long-range military procurement program which today is not possible because of limitations on the life of appropriated funds. If such a program could be made legally possible, ACC says it would: "greatly reduce aircraft cost; (produce) a more efficient and stable aircraft industry, and a sounder basis for industrial preparedness measures."

▶ **Constitution Key**—Key to this situation is the construction of the United States which states specifically that Congress shall have power "to raise and support armies, but no appropriation of money to that use shall be for a longer term than two years." As part of the Army, the AAF for years has been stymied in its long-range planning by that proviso. There is no such Constitutional limitation on spending of Navy funds.

That the armed services are coming closer to definite steps on the procurement of transport airplanes and close cooperation with commercial airlines is indicated in ACC's discussion of military aviation. "The armed forces should maintain in peacetime air transport services capable of furnishing the continuing military requirement for transportation, developing technique and methods applicable to wartime operation, and expanding through utilization of civil air carriers to meet an emergency.

"It is essential, therefore, that methods be developed for handling mass movements of military personnel, supplies and equipment by air and that the services performing such movement be a part of the armed forces. Further, in case of emergency or mobilization, it must be possible to utilize the commercial air transport system as necessary to augment the military air transport services."

That, to most observers, implies cooperation with airlines to standardize to some extent transport planes for both military and civil use.

▶ **Remind Airlines**—In ACC's section on civil aviation, the airlines are reminded that air mail payments are not free meal tickets, a fact that is implicit in the Civil Aeronautics Act, but which has not been as sharply called to public attention in several years.

ACC says, "the Civil Aeronautics Act of 1938 authorizes mail payments based on the need of the air carrier as defined in the act. It does not, however, authorize indiscriminate support for operation at a profit of all services authorized to carry the mail. Fair compensation to the airlines . . . . is of course mandatory but the payment of a greater amount requires strict tests of the usefulness of the operation. . . . Moreover, losses incurred by management which is not honest, economical and efficient cannot be underwritten. . . ."

▶ **Recommendations Listed**—The phrasing of that final sentence is closely akin to the wording of several bills introduced late in the past session of Congress.

ACC also stated on:

• **Airlines**—It may become desirable to permit mergers, abandonment or reassignment of routes or liquidation of a carrier. There are no factors making necessary a step toward the so-called "chosen instrument" at this time. Accident reports should be promptly published (they are now running from six to eight months behind). Air navigation aids for civil and military purposes will be coordinated and designed to meet common operating requirements.

• **Personal Flying**—There should be federally-aided research on the elements required to improve personal aircraft and to accelerate the development of advanced types and components (lightplane manufacturers have already turned down part of that proposal). There should be Federal assistance for civilian flight training, should the volume of unassisted training fall so low as to require such a program.

• **Military Aviation**—There should be in being an Air Force strong enough to repel any attack, and to retaliate, rather than continuing the historic policy of maintaining a nucleus of such a force.

• **Aeronautical Science**—There must be concentration on pure research, with the Government financing projects too expensive to be undertaken by industry. Design and development of advanced aircraft, missiles and aeronautical devices must be conducted by the aircraft industry under Government sponsorship. The Government, the only substantial purchaser of air navigational aids, must by developmental contracts encourage private industry to furnish such aids.

Eastern Crash Termed Mystery

Eastern Air Lines' DC-4 crash at Port Deposit, Md., last May was tagged as a mystery last week by the special Presidential Air Safety Board. A special report indicated no evidence has been found on the cause of structural failure of the empennage that immediately preceded the crash. The Civil Aeronautics Board Safety Bureau has not yet issued its official report.

The President's Board revealed that the following precautionary measures have been taken on airline operated DC-4's converted from war surplus:

- **Replacement** of quarter-inch elevator hinge bolts with five-sixteenths of an inch bolts (AVIATION WEEK Aug. 4).
- **Removal** of control surfaces for inspection every 1,000 hours instead of the 8,000 hours previously required.
- **Further Manufacturers** test on the tail structure of an old DC-4 to determine its capacity to withstand torque. The test disclosed no apparent weakness.
- **Minute Inspection** of tail surfaces of several of the oldest converted C-54s in commercial service for evidence of cracking deterioration or metal fatigue. Results were wholly negative.

The Board also recommended that:

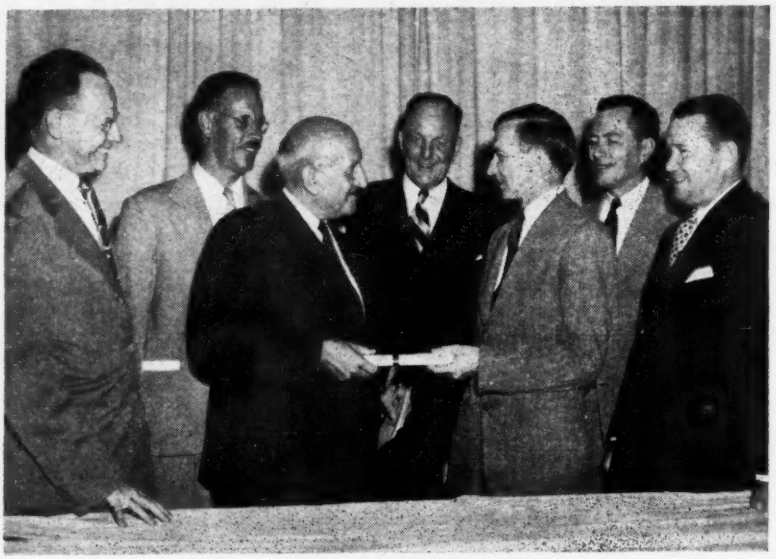
- **NACA** make special studies on methods for inspecting aircraft structures for incipient fatigue failure: effects of repeated loads on strength of typical aircraft structures and an analysis of wing and tail loads on transport types in approximately vertical dives.
- **CAA Study** design conditions for sustaining aerodynamic loads on elevators with one hinge out.
- **Manufacturers** make an engineering study of refinements possible in the torque box section to permit heavier concentrated loads on light materials with particular emphasis on elevator hinge stiffeners.

The Board is preparing to hold hearings on the need for addition of a flight engineer to the crew of four engine aircraft. The Air Line Pilots Association has long campaigned for this addition. Airlines generally oppose it.

As a result of the Board's recommendation, a temperature factor will be included in calculating maximum gross take-off weights under the transport category of the Civil Air Regulations. Proposed regulation is being circulated for comment while an emergency regulation was scheduled to become effective immediately to alleviate alleged overloading under the old formula during the remaining weeks of summer.

FAI Conference

Harry K. Coffey, Portland, Ore., aviation enthusiast and Alaska distributor for Beech, will represent the United States and the National Aeronautic Association as a delegate to a conference of the Federal Aeronautique Internationale in Switzerland.



AVIATION NOTABLES MEET

Four noted past presidents of the Institute of Aeronautical Sciences watch as current President Preston R. Bassett (right) of Sperry Gyroscope Co. presents the Thurman H. Bane Award to Adolph L. Berger, Wright Field civilian engineer. Presentation was made at the 15th Anniversary meeting of IAS in Los Angeles. In the background (left to right) are Arthur E. Raymond, vice president-engineering, Douglas Aircraft Co.; Dr. Clark B. Millikan, acting director, Guggenheim Aeronautical Laboratory; Reuben H. Fleet, founder of Consolidated Aircraft Corp.; S. Paul Johnston, IAS director; and Hall Hibbard, vice president and chief engineer, Lockheed Aircarft Corp. (E. H. Hoff photo)

NEPA Transfer to AEC Looming

NEPA, one of the few major atomic energy programs still in military hands is scheduled for transfer to the Atomic Energy Commission within the next few weeks. A study of nuclear energy for propulsion of aircraft, the project is sponsored currently by the Army Air Forces to develop an atomic-powered airplane.

Fairchild Engine and Airplane Co. the organizer and prime coordinating contractor for the project, will be divorced from administration of the project in favor of AEC direction. It is believed, however, that Fairchild and the numerous aircraft industry contractors (a majority of aircraft manufacturers) will probably continue in their research and experimental activities on the problem. Now about a year old, NEPA has been pretty much a military stepchild with low manpower and materials priorities.

The decision results from completion this month of an overall study of the project by the top-level Joint Research and Development Board. This Army-Navy group reviewed preliminary results, approved, and gave a definite "go ahead" to engineering plans. JRDB also recommended that the Fairchild contract be taken over and administrated directly by AEC, thereby integrating it into the high manpower and materiel priorities system available to the atomic program generally.

AAF generals vigorously challenge the move but see little hope of combatting the powerful JRDB. The generals insist that the AAF retain a voice in the administration of the contract, in view of its aircraft application, and threaten to take the fight to the White House if necessary. No indication has been made as to how the White House would react to such action.

Tariff Probe

An investigation to determine whether the certificated airlines' new official airfreight rate tariff is discriminatory or unduly preferential has been launched by CAB at the instigation of the Air Freight Forwarders Association and the Detroit Board of Commerce. The tariff, which became effective Aug. 1 and reduced average freight rates 25 percent, will continue in force pending outcome of the probe.

AFFA had charged that the effect of the new uniform rate tariff filed by 19 certificated airlines is to prevent indirect air carriers (forwarders) from obtaining reduced rates for consolidation of less than planeload shipments into planeload lots. The forwarders said the tariff assesses the public the same rate per 100 lb. for dispatching 15,999 lb. as is charged for 100 lb. and stated that this set-up ignores long-recognized transportation economics which show it costs relatively less to handle volume shipments than small lots.

ALISON TAKES OATH

John R. Alison is sworn in as Assistant Secretary of Commerce for Aeronautics by his boss, Secretary of Commerce Averell Harriman. Alison is making a thorough study of his problems facing his agencies before formulating policy.

Introducing John Alison

New Assistant Secretary of Commerce for Aeronautics has had wide experience as pilot, administrator and aviation planner.

By ROBERT HOTZ

When Johnny Alison was a fighter pilot in China, not so many years ago, his Commanding Officer told this writer:

"If I went back to the Pentagon 10 years from now I would expect to find Johnny Alison running the Air Force."

That prophecy was an accurate in spirit as it was wrong in detail. Today, less than five year later, Johnny Alison holds one of the top administrative posts in civil aviation as Assistant Secretary of Commerce for Aeronautics. This involves supervision of Civil Aeronautics Administration, Coast and Geodetic Survey, Weather Bureau and membership on the Air Coordinating Committee and the National Advisory Committee on Aeronautics.

▶ **Appointment a Surprise**—Alison's appointment came as a distinct surprise—both to Alison and to the aviation industry which had been watching another man's name grind through the political mill that generally leads to appointment. Alison is no politician. He can deliver no vote but his own.

His selection was based on a brilliant 11 year career as an airman and the happy coincidence that Averell Harriman, now Secretary of Commerce, had an opportunity to observe Alison in action under heavy military and political pressure in England and Russia.

What kind of a man is Johnny Alison?

• **He Has Been Flying** for 11 years—fighters, bombers, transports and gliders. He has bailed out, been shot down and landed a 13 man glider loaded with 17 troops at night 200 miles behind enemy lines in Burma.

• **He Rode Down** a flaming P-40 to a crash landing at night in China rather than bail out because whatever parts could be salvaged were desperately needed to keep his squadron's other planes in the air.

• **He Ran Operations** of a 700 plane air force in combat under a general who demanded that every flyable plane fly a mission every day. Average tenure in the job was six weeks. Alison stayed for seven months until the end of the war.

• **He Talked Back** to General Arnold when Arnold asked him to accept a mission without telling Alison its purpose.

• **He Resigned** a Regular Army commission and gave up a Colonel's rank because 11 years before he had decided to make his permanent career in civil aviation.

Johnny Alison is a short, bouncy fellow of 35 who after 11 years of flying, a Purple Heart, and a bellyful of war, still bristles with enthusiasm for aviation. His sandy hair is thinning a bit on top and he still talks with a fighter pilot's expressive hands.

He graduated from the University of Florida with an Engineering Degree in 1936 and joined the Army to learn to fly, planning a return to civil life in four years.

By the time he was ready to leave the Air Corps in 1940 the threat of war was so strong that Alison decided to sweat it out in the Army for the duration. He became an expert on the Curtiss-Wright P-40s and demonstrated an early model at Bolling Field to the Chinese who were in the market for planes to equip the American Volunteers, later known as the Flying Tigers.

▶ **Wrung Out P-40**—Those who saw Alison wring out that early P-40 still talk about it. When he landed the Chinese were highly pleased.

"We need 100 of these," said the Chinese pointing to the P-40.

"No," said Maj. Gen. Claire Chennault, Flying Tiger Commander and then adviser to the Chinese Government, "you need 100 of these."

He pointed to Alison.

Alison's military experience has given him a practical taste of most of the problems he faces in his new job. He learned diplomacy and top level wrangling working with the British in Burma, the Russians in Archangel, Moscow and Persia, Chinese in China and reconciling the jarring personalities of air force staff into a successful operation.

▶ **Maintenance Problems** — He learned maintenance problems the hard way, by assembling and testing lease-lend P-40's in England and the Russian Arctic; doing the same for B-25's in the heat and dust of Southern Persia; and keeping a fighter squadron in combat over China with only hand tools and improvised spares.

His first taste of transport problems came when planning and organizing with Col. Phil Cochrane the first Air Commando Air Lift of 12,000 Wingate Raiders and 2,000 mules over 200 miles behind the enemy lines in Burma. Alison flew the lead glider on that show, landing it at night. He supervised selection and building of airports; handled air traffic control and solved air lift problems for this incredible operation.

▶ **Okinawa Traffic**—He wrestled with air transport again as operations officer of the Fifth Air Force in the Philippines where the entire air force moved by air every few months and finally in planning and supervising the American occupation of Japan with two divisions airborne by 200 Air Transport Command C-54s from Okinawa to Tokyo.

After he resigned from the Army in 1946, Alison spent six months making a survey of the nonscheduled air cargo business and fixed base operations for a group of Chicago investors. This survey gave him an insight into the post-war picture of civil aviation at its grass roots.

Now Alison is sitting in his air conditioned Commerce Building office, reading heavily, building up a background on the specific problems facing the agencies under his control, preparing for heavy action on all fronts as he comes to grips with the same old problems in civilian clothes.

U. S. Sells Armed Planes Abroad

State Department approves sale of 452 combat planes to foreign governments.

Sale of 452 fully-armed U. S. combat and military aircraft to foreign governments since V-J day have been revealed by the State Department.

There aircraft comprise only about one-third in value of total combat materiel sold to foreign countries since the end of the war. With an original procurement value of $46,979,611 these aircraft sales netted $3,511,110, a return of about 7½ cents on the dollar. This return compares favorably with War Assets Administration's return on CAA-approved surplus trainers and is considerably higher than WAA's return on surplus combat aircraft, not licensable by CAA, which have been disposed of on a scrap tonnage basis. State Department sales of armed combat aircraft are made only to foreign governments (as distinguished from individuals or groups) or Allied Control Commissions and then only after each request has been carefully studied for potential political effects.

▶ **Italy Gets 150**—Although the majority of these aircraft and supplies was sold to South American countries, the largest single sale was 150 Lockheed P-38 and Bell P-39 fighters to Italy, with which the U. S. is still technically at war. This equipment originally cost $14,366,069 and was sold for $160,550. Countries purchasing U. S. military aircraft and equipment are:

• **Brazil:** 25 Republic P-47D fighters (8 .50 cal. machine guns), 64 North American B-25J bombers (8 .50 cal. machine guns in turrets), 5 Beech AT-7 and 5 Beech AT-11 transferred on June 18, 1947 for $1,194,500. In addition spare parts for 30 Republic P-47D and 70 North American B-25J transferred on Mar. 10, 1947 for $135,566.

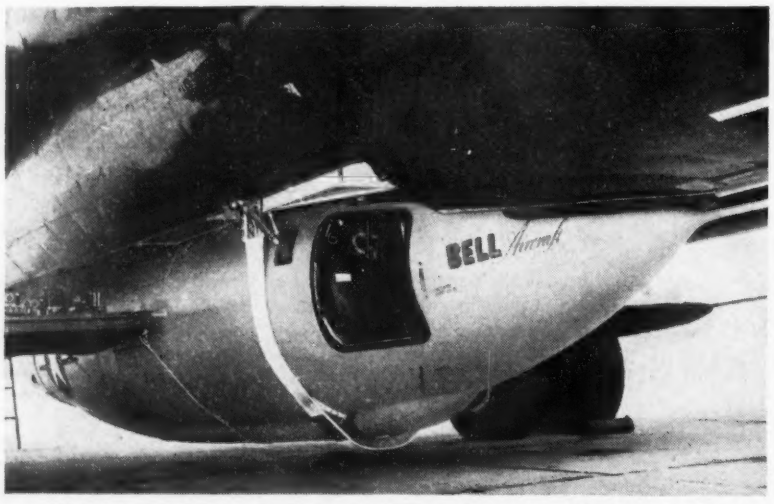
• **Venezuela:** 5 Republic P-47D, 3 North American B-25J, 6 North American AT-6C (3 .30 cal. machine guns); 6 Beech AT-11H, 16 miscellaneous aircraft engines and various aircraft and engine spare parts transferred on June 30, 1947 for $328,825.30.

• **Colombia:** 8 Republic P-47D, 3 North American B-25J, 2 Consolidated OA-10B (Catalina amphibian), spare engines and spare parts, transferred on June 30, 1947 for $182,248.

• **Peru:** 25 Republic P-47D, 8 North American B-25J, 3 Consolidated OA-10A, spare engines and spare parts, transferred on Feb. 25, 1947 for $418.935. Six Lockheed PV-2 with spare parts were transferred on April 17, 1947 for $49,500.

• **Portugal:** 5 Boeing B-17 Flying Fortress bombers reconverted for air-sea rescue operations and 3 Douglas C-54 transports were transferred on July 1, 1947 for $561,551.76. State Department export license is required for all C-54's weighing in excess of 35,000 lb. (This would include all DC-4 types with engines installed but not those without engines.)

• **Sweden:** 90 North American P-51 fighters (6 .50 cal. machine guns) transferred for $315,000. Aircraft spare parts worth $14,000 were transferred on Mar. 11, 1947. On May 15, 1947 a total of 5,500,000 rounds of .50 cal. armor-piercing-incendiary linked aircraft ammunition was transferred for $787,096—the original procurement price of this material for the U. S. government.



FIRST CLOSEUP OF ROCKET PLANE INSTALLED

Bell XS-1, shown tucked in belly of Bell-built B-29 "mother plane" shows attaching web belts, one end of which is released to permit research airplane to drop free. Planes separate very slowly, since there is little relative movement at initial stage of drop. Sway brace (behind cabin door) prevents lateral movement of XS-1 during tethered flight. XS-1 has completed 11 power flights and 16 glide flights to date. It has been officially turned over to AAF and NACA for extensive scientific research program. (A. U. Schmidt photo)

Belated Award

Belated recognition of heroism 22 years ago by Vice Admiral Charles E. Rosendahl, famed Navy lighter-than-air expert and outspoken advocate of large airships, has been accorded by a special act of Congress awarding him the Navy Distinguished Flying Cross. Rosendahl was honored for his action on Sept. 3-4, 1925 in guiding to safety a broken half of the U. S. S. Shenandoah containing six crew members.

Rosendahl also received the Navy distinguished Service Medal for his wartime direction of the Navy's lighter-than-air training and experimentation program from May, 1943 to August, 1945. Fleet Admirals Kink and Nimitz, Secretary Forrestal and other Navy officials witnessed the presentation.

Rosendahl, who retired last September after 36 years of Navy service, is now organizing a world-wide lighter-than-air service.

• **Canada:** 30 North American P-51D transferred on Apr. 25, 1947 for $300,000. In addition, Canada has received 2,000 empty bomb bodies at a price of $435.70.

• **Uruguay:** Spare parts for North American AT-6 transferred on Apr. 16, 1947 for $23,006.23.

In addition to these sales, the State Department has approved the following retransfers of lend-lease material from foreign allied governments to other nations: Australia: one magnetic airborne detector, 40 airborne loran sets and 50 naval avaition radio sets; Greece: 14 Pratt & Whitney engines and 14 Hamilton standard propellers; Norway: 12 Pratt & Whitney engines and 46 Hamilton standard propellers; Union of South Africa: 1600 aircraft engine spare parts; Canada: 640 Packard Merlin engines, 640 Hamilton standard propellers and 107 Glenn L. Martin turrets; Czechoslovakia: propellers and spare carburetors for one squadron of DeHavilland Mosquito light bombers and spare guns and barrels for three squadrons of British Spitfire fighters, these items being U. S. Lend-Lease equipment installed on British aircraft; France: 2 Lycoming aircraft engines, and Turkey: 11 Martin Baltimore light bomber spare parts.

State Dept. has tentatively earmarked approximately $12,000,000 for military aircraft for Turkey, although the exact types and quantities have not yet been revealed. State Department officially denies that the equipment will contain any Boeing B-29 superfortress long-range bombers. The B-29 is still classified as operational, first-line type by the AAF and none have been declared for surplus sale to date. Reports continue that Turkey is lengthening runways at its strategic airports in preparation for larger aircraft than are presently in operation there.

New AAF-Bell Helicopter Flying

XR-12 is military version of model 42; powered by Pratt and Whitney 550 hp. engine

Bell Aircraft's second military helicopter, the XR-12, has been successfully test flown and is now undergoing preliminary flight and ground tests at Buffalo, N. Y. preparatory to delivery to Wright Field. Essentially a military version of the Bell model 42, the XR-12 is powered by a Pratt and Whitney 4-1340 Wasp engine developing 550 horsepower and driving a single main rotor with vertical tail anti-torque rotor.

The five-place XR-12 has a top speed of 105 miles per hour and cruises at 90 miles per hour. It has a service ceiling of 13,000 ft. in forward flight and a hovering ceiling dead in the air of 4,350 ft. Its range is 300 miles and its rate-of-climb vertically is 450 ft. per min.

▶ **General Utility**—The XR-12 is designed for general utility helicopter use and has provisions for twin floats, rescue hatch and hoist, Army canvas litters, life rafts and the Navy stokes litter, a metal-framed, wire-protected litter of larger dimensions and greater comfort. Accommodations include a crew of two and three passengers in a transport version and a pilot, two litter patients and an attendant for emergency rescue or evacuation duties.

Tactical missions of the XR-12 include personnel evacuation, cargo transport, observation, liaison, ground cooperation and fire control operations. It has a gross weight of 5,803 lb. and carries a useful load of 1,630 lb.

▶ **Two Prototypes**—The AAF XR-12 contract calls for the delivery of two XR-12 experimental prototype articles, one static test XR-12 structure and a production quantity of 10 XR-12. Delivery and acceptance of the two-place YR-13, military version of the Bell model 47 commercial helicopter, has been completed. This contract called for a total procurement of 28 QR-13's by the AAF with delivery of 10 of this quantity to the Navy as HTL-1 training helicopters, leaving 18 YR-13's for AAF service tests.

The Bell model 42, prototype of the XR-12, first flew more than a year ago and has undergone extensive flight tests and minor modification in the interim. Bell's design and construction of the five-place model 42 was undertaken as an experimental and development job only and production plans have not been seriously studied due to the totally undeveloped markets for the time. The decision to plan model 47 production on the basis of 500 units was made as the basis of a market trial and development program, since it was only on the basis of this production quantity that a retail price within practical limits could be established. Commercial price of the model 42 would be astronomical at present. Bell hopes that the market created by the 500 model 47's will create a substantial demand for the model 42 on the basis of which he can project 500 units.

▶ **Commercial Aid**—The AAF contract for the XR-12 may enable Bell to amortize tooling and design costs to a point making model 42 production for commercial sale a practical prospect. AAF's fiscal 1948 budget contains procurement funds for additional helicopter purchases and both Bell and Sikorsky are known to figure prominently in the 1948 procurement program. Additional XR-12 procurement would further reduce costs and render a commercial model 42 program attractive to everyone concerned.

The XR-12 is substantially an enlarged version of the YR-13 and resembles it closely in configuration. Main rotor diameter is 47 ft. 6 in., as compared to the YR-13's 35 ft. 1½ in. and it weighs about 165 percent more than the two-place version. Both use the gyroscopic action stabilizing bar developed by Arthur M. Young, chief engineer of Bell's helicopter division. The XE-12 anti-torque rotor is a three-blade design 7 ft. 6 in. in diameter, while the YR-13 uses a two-blade rotor 5 ft. 8 in. in diameter. A major difference is the tricycle landing gear, with "nose wheel" on the XR-12, whereas the YR-13 uses automobile type gear.

Two views of Bell's XR-12 Helicopter now undergoing preliminary tests at Buffalo, N. Y.

AVIATION CALENDAR

Sept. 5-7 — Ninety-Nines annual meeting, Troutdale-in-the-Pines, Denver, Colorado.

Sept. 6—Anglo-American conference, Institute of the Aeronautical Sciences and Royal Aeronautical Society, London.

Sept. 10—ICAO legal committee, Brussels.

Sept. 13-14—Wisconsin Civil Air Corps convention, Milwaukee.

Sept. 8-12—Second annual conference and exhibit. Instrument Society of America, Hotel Stevens, Chicago.

Sept. 15-17—Air Force Association, first annual convention, Columbus, Ohio.

Sept. 16—International Air Transport Association, technical committee, Nice.

Sept. 16-18—Second Regional CAA conference, Atlanta.

Sept. 17 — ICAO meteorological division, Montreal.

Sept. 23—ICAO aerodromes, air routes and ground aids division, Montreal.

Sept. 23—ICAO joint air/ops committee meeting, Paris.

Oct. 2-4—Autumn aeronautics meeting, Society of Automotive Engineers, Biltmore Hotel, Los Angeles.

Oct. 3-4—Arizona State Aviation Conference, Douglas, Ariz.

Oct. 6—International Air Transport Association, executive committee, Rio De Janeiro.

Oct. 7—International Air Transport Association, traffic committee, Rio De Janeiro.

Oct. 14—International Air Transport Association, third annual general meeting, Petropolis.

Oct. 15-18—Montreal Board of Trade, second annual air conferenc, Montreal.

Oct. 20—International Air Transport Association, executive committee, Petropolis.

Oct. 20—Air Industries and Transport Association of Canada, annual meeting, Gray Rocks Inn, St. Jovite, Quebec.

Oct. 20—ICAO meeting on multilateral agreement, Rio De Janeiro.

Oct. 24-26—"Air Day in Texas" aviation show, Harlingen, Texas.

Oct. 26-28—National Association of State Aviation Officials, Fort Worth, Texas.

Nov. 4-7—National Airport Show and Institute, sponsored by Air Foundation and National Aeronautic Association, Municipal Auditorium, Cleveland.

Call Combats Lightplane Slump With Diversified Production

Wyoming company subordinates plane output to line of snowshoes, motor scooters, aircraft skis.

Call Aircraft Co., although one of the smallest of the nation's personal plane manufacturers, is weathering the current slump in lightplane demand with a well-planned policy of diversification that subordinates production of planes, but still permits small output of a new CallAir 125 hp. model.

Despite its location at Afton, Wyo., in an isolated valley 55 miles over a mountain pass from the nearest railroad, Call has a steadily increasing demand for products ranging from snowshoes to its airplane.

Character of the operations of CallAir, a subsidiary company that uses a fleet of oil and gas trucks to carry more than 2,000,000 gal. of fuel a year in Wyoming and Utah, inspired Call Aircraft's latest product: heavy-duty radiator grills for trucks. These were manufactured at first for CallAir's own use, and this lead to a profitable sideline in the production of truck grills for commercial sale. The company also makes, on order, insulated truck bodies of all sizes.

► **Made for Snow Country**—There is a natural connection between Call Aircraft's location and some of its other products: the snowshoes, quickly detachable skis for both light and heavy aircraft, snow cars and motor scooters and side cars. These supplement the regular production of CallAir planes.

The former 2- 3-place Model A-2 with 125 hp. Lycoming engine has been supplanted by the A-3 with 125 hp. Continental. Call is manufacturing about 18 of these a year with a selling price of $4,000 including starter, and states it has a many months' backlog. With two people, the plane is designed to take off in 300 ft. at an altitude of 6,400 ft.

Snowplanes, selling from $1500 to $2500, have developed a fairly good market and preliminary summer work has made possible the production of several dozen this winter if sales demand it.

► **Scooters Custom Made**—One crew has been on steady production of the light plane skis and Reuel Call, president and general manager of the company anticipates sale of approximately 1000 pairs this winter at about $90 a pair. Six motor scooters have been produced in experimental sizes and weights but no definite policy has been set for production on them yet. Probably they will be custom built for specific needs, as are most of the snowcars and the other CallAir products.

By diversifying production, the company has been able to keep its full complement of employes with no slow-downs and no layoffs. It is a small operation when compared to most light aircraft factories, but it is an example of how a small company can keep going by regulated expansion dictated by market demands.

As most employes are living in their own homes, and as they either own small farms or have next of kin who are farming, they are able to provide the basic needs of a small industrial community that is very stable and has none of the disadvantages found in purely industrial production areas with high rents and high living costs.

Reuel Call, head of Call Aircraft Co., inspects the new steel-frame bearpaw-type snowshoe which is standard equipment in the snowcars and CallAir planes sent out to deep-snow airports. The plane is the new Model A-3. Under the wing is parked one of Call's motor scooters, made in several models, one of which will carry two people.

Rex Young, Call Aircraft Co. employe, holds one of the quickly detachable skis for light planes. This model sells for $90 F.O.B. Afton, and a new ski has just been type certificated to carry aircraft up to 2,500 lb. It will be produced in both wood and steel-aluminum.

2-0-2 Featured on Stamp

Glenn L. Martin Co.'s model 2-0-2 will be featured on the new ten-cent airmail stamp which goes on sale Aug. 30. The 2-0-2 will be shown in flight over the Pan American Building in Washington, and the stamp is being provided principally for use on airmail to Latin America.

The 2-0-2 is expected to appear in person on the Pan American scene shortly, as deliveries begin to Linea Aerea Nacional of Chile. With the new Martin plane now certificated, the first of LAN's transports was moved to the Martin airport for flight tests last week. Meanwhile, Martin is preparing to deliver more certificated airplanes to Northwest Airlines.

Lightning Research Aimed at Protection

100,000,000 kw man-made bolts hurled at Northrop F-15 in tests at Minneapolis

In experiments seeking to develop devices to protect aircraft from lightning, man made bolts up to 100,000,000 kilowatts are being hurled at a Northrop F-15, photographic version of the P-61 Black Widow, by scientists at the Lightning and Transients Research Institute, Wold-Chamberlain Field, Minneapolis.

The institute is backed by industrial grants and government contracts (AAF's Air Material Command, the Navy's Bureau of Aeronautics and the Office of Naval Research) and is under the research directorship of Prof. M. M. Newman of the Department of Electrical Engineering of the University of Minnesota. Chairman of the Institute is Prof. J. M. Bryant, head of the department of electrical engineering at the university.

► **Test Effects**—In the Wold-Chamberlain Navy Research Hangar, institute scientists hurl lightning bolts at aircraft to test various ways to minimize its effect. A forty-foot generator, specially constructed for the purpose, can build up for perhaps 10-millionths of a second a potential of some 100,000,000 kilowatts of power, said to be greater than that of all the power stations in the United States put together.

Though lightning has almost never figurged as a cause in fatal commercial air accidents, it is an ever-present danger. Only last February an Army B-17 on its way to Okinawa was racked by lightning, its fuselage torn and wrinkled and its radios knocked out. Lightning, said the Army report of the incident, "may account for several unexplainable explosions during flights where aircraft have failed to return."

"Lightning," says Prof. Newman, "is not one of the most serious flying hazards and combatting it is just one of many factors needed for flight safety. Still, lightning is definitely not a trivial thing. You have to learn the facts and you have to take intelligent action."

Right now the Institute is concentrating on learning the facts—how lightning endangers airplanes, for example—and it is looking forward to the development of protective devices after it knows more about lightning.

► **Equal Thunderstorm**—As experiments are carried on inside the huge hangar one sees flashes of light that equal those of summer thunderstorms. As it flashes, there is a thunderclap that sounds like the crack of a big gun. It is loud and unnerving enough to make you wish you'd stuffed cotton in your ears. Target of the man-made lightning is an Army F-15, photographic adaptation of the Northrop Black Widow night fighter.

Lightning has been tossed at the plane with people inside. They suffered no harmful effects. Metal strips straddling the plastic canopy over the cockpit serve to by-pass the high voltages around those sitting inside.

So far, tests have been made only with the plane's tanks drained of gasoline. They will be filled before ground experiments are over. Eventually the F-15 will be rigged with lightning rods and recording instruments and sent aloft to chase thunderstorms. It will seek out the hottest part of such storms and trail a copper antenna as an engraved invitation for lightning to strike. Those flights will be made by Newman with Lt. Eldor H. Schueler of Austin, Minnesota, as pilot.

► **Investigate Transients**—Institute scientists also are investigating "transients"—momentary electrical disturbances—that often play hob with electrical power transmission and radio communications. In conducting their research, institute workers have developed a high-speed, airborne cathode ray oscillograph, a recording device in which an electron beam traces a path on a fluorescent screen. This portable oscillograph can record lightning bolts that last only one-half a millionth of a second.

Last winter the Institute set up a lightning observatory in Peru, high in the Andes mountains. Another is to be set up in the Rocky Mountains and another at the tip of Foshy Tower, a tall building in Minneapolis. Eventually studies made at all these locations will be correlated.

Man-made lightning hits Northrop F-15 in Minneapolis tests.

Cessna Racing Gear

Slim spring-steel landing gears developed by Steve Wittman, veteran racing pilot, for the Cessna two and four-place personal planes, are going back into the racing game on a number of the midget racers now being built for competition in the Goodyear Trophy races at the National Air Races at Cleveland on the Labor Day weekend. Two-place Cessnas have won a number of "stock plane" races at various meets, including last winter's Miami Air Maneuvers light-plant race, and much of their speed is attributed to the low drag of the slender but sturdy landing gear legs. Goodyear race model specifications call for fixed gear on the planes entered, so the Cessna gear has already appeared on midget planes entered by Art Chester and Tony LeVier, and probably will be used by other designers as well.

Lockheed Saturn Making Test Flights

Lockheed's Saturn transport, newly powered with 850 hp. Wright engines, is undergoing evaluation test flights at Lockheed Air Terminal, Calif.

It is the second of two prototypes built by Lockheed, the first having flown a year ago. A short time later, confronted with serious engine cooling problems, Lockheed abandoned further flights and announced the shelving of the airplane.

The new engines may make the model a potential contender again in the small transport market. In test flights that began Aug. 8 no cooling problems have been evident.

Lockheed may be expected to decide within the coming month whether production now will be attempted.

Losses Reported

Beech Aircraft Corp. reports a deficit of $1,562,350 for the nine months ending last June 30 after a carryback tax credit of $2,803,805. Sales for the period were $22,386,155.

Aero Supply Manufacturing Co. reports net loss of $140,857 for first six months of this year compared to a $19,392 loss last year.

INDUSTRY OBSERVER

► Pilotless Aircraft Research Conference held recently at McDonnell Aircraft factory in St. Louis included a discussion of the company's PA-11 and PA-15 contracts with Army Air Forces. Both resojet and ramjet power plants for these two guided missiles were analyzed. This is first of AAF'S new series of technical discussions at contractor's plants on guided missile research and development contracts.

► AAF has cancelled all compound engine development contracts, including those with Wright Aeronautical and Pratt & Whitney following continuing reports of difficulties and re-analysis of the field of usefulness of this power plant. AAF no longer sees a return on its investment within a reasonable period from these projects.

► AAF current inventory of bomber, fighter, transport and reconnaissance aircraft is approximately 17,500 of which 9,500 are in storage and 8,000 in active service.

► Glenn L. Martin Co. plans test to get CAA certification for use of water injection on the Pratt & Whitney R-2800 engines now in use on its model 202 transport. The R-2800 is rated at 2,100 hp. dry and 2,400 hp. with water injection. If water injection is approved Martin hopes to boost the 202's gross weight from 38,000 lb. to 39,500 lb.

► Pratt & Whitney has completed and placed in service a revised R-2000 crankcase design, following numerous failures in service, largely on surplus AAF and Navy engines. Although no difficulty was experienced during the war on the various series R-2000, when the airlines began to receive converted C-54 and R5D transports, they were operated at higher takeoff and normal rated power than in military service resulting in abnormal loads on the crankcase. Postwar production models, 2SD1G and 2SD13G7, sold to the airlines, have been fitted with new crankcases free of charge by P&W. The new crankcase is part of an airline service test program which P&W feels confident will provide a complete solution to the problem.

► North American Aviation has moved to Long Beach Airport for completion of its second and third B-45 jet bombers. The company's jet bomber production line is expected to be in operation by Oct. 1, manned by 1,800 workers. At scheduled peak production later in the year 2,800 will be employed.

Direction of landing aids experiment station at Arcata, Cal., is expected to be turned over to CAA management Jan. 1, 1948. H. J. Cory Pearson, of CAA's experiment station at Indianapolis, is reported to be under consideration for appointment as supervisor of the Arcata project.

► When Convair's XC-99 transport flies, no attempt will be made to apply optimum pre-rotation to the big plane's wheels. Company engineers do not show the concern over pre-rotation evidence by Lockheed, which is installing Deever pre-rotation motors (electric) on all main gear wheels of the Constitution. Convair attitude on pre-rotation is: "We'll ride the fence until it is shown that it will pay us to use it." Engineers point to successful operation of the XB-36 without wheel pre-rotation in declaring their stand.

► Dutch Fokker plant has ordered 115 Aeromatic model 220 propellers for use on the Fokker Promoter, which is now in production.

► Douglas has delivered the last DC-4 transport, following the production of 1,163 military versions and 79 commercial models since V-J day. With more than 1,000 in current use, Douglas service experts predict that DC-4's will be still flying in 1957.

► Navy now has 24 GCA stations in operation in the United States with three more nearing completion.

► Instrumentation of the 80-mile White Sands Rocket Proving Range may cost close to $10,000,000 before it is completed. But Ordnance experts count the cost as relatively small in assuring good recording of results of one-flight missiles that may cost in the neighborhood of $1,000,000 each. Present cost of experimental guided missiles now under test does not exceed $100,000 per unit.

► Guided missile technicians meeting in Los Angeles recently, at the summer Conference of Institute of Aeronautical Sciences, were told that if their experimental rockets are to be calibrated accurately there will have to be a re-measurement of the speed of light. L. A. Delsasso, chief of the ballistic measurement laboratory, Aberdeen Proving Grounds, told them that light speed errors throw off the optical measurement of rocket flights as much as 100 ft. in 100 miles. Electronic tracking, using the Doppler effect, is more accurate, showing an error of as little as 10 ft. in 100 mi.

Plane Exports Total $3,649,186

Principal personal aircraft manufacturers exported 987 planes valued at $3,649,186 in the first six months of this year, according to Aircraft Industries Association.

Planes going overseas were 9.3 percent of total production, and 10.8 percent of total value of the personal aircraft manufacturers. For the entire year 1946, the same 11 companies exported 1,383 planes valued at $3,298,342, which were 5.2 percent of last year's production and 4.3 percent of the value of total production in 1946.

Canada was the leading importer of personal planes in the first half of this year, with 175 valued at $725,378. Argentina ranks second, with 123 planes costing $455,513.

Companies whose exports are included in AIA's figures are: Aeronca, Beech, Bellanca, Cessna, Engineering & Research, Fairchild, Luscombe, North American, Piper, Republic and Stinson Division of Consolidated Vultee.

Export figures covering the entire aircraft industry for the first five months of this year, as reported by AIA from Department of Commerce information, disclose total aircraft shipments of 1,569, valued at $28,232,000. During the same period, 2,074 engines costing $6,925,500 were sent out of the country. Parts and components shipments in export amounted to $33,787,600, for total aeronautical exports for the five months of $68,945,100.

Engineers Flight Check Television Reception

Engineers of the Allen B. Du Mont Laboratories, working in conjunction with the AAF and Signal Corps, installed television receivers and measuring equipment in a plane and flight checked reception of broadcasts of WABD, New York (flying between New York and Boston) and WTTG, Washington, D.C. (flying between New York and Washington).

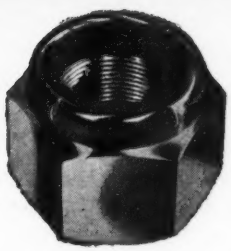
Results indicated that adequate signal strength was available for line-of-flight reception up to a range of 250 mi. due to favorable altitude of airborne equipment.

U. S. Patents on Powder Metallurgy Available

A comprehensive list of powder metallurgy patents which was obtained from a collection search of 2,253 items and classified in related groups with short abstracts of each invention, has been made available as NBS publication M184, *United States Patents on Powder Metallurgy*, by Raymond E. Jager and Rolla E. Pollard.

The list is available from the Superintendent of Documents, Washington 25, D.C., at 30 cents per copy.

RUBBER *Flexible Mounts* WHIRLING AT 2,500 RPM



LOOK FOR THE RED COLLAR
THE SYMBOL OF SECURITY

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All ESNA Elastic Stop Nuts — *regardless of size or type*—lock in position anywhere on a bolt or stud. Vibration, impact or stress reversal cannot disturb prestressed or positioned settings.

—yet the Red Elastic Collar locks each positioned setting against VIBRATION!

Here's an interesting detachable fastener problem: Bolting an eleven pound cooling fan assembly to the fly wheel of a 215 HP Franklin Aircraft Engine. The connections are rubber mounted to inhibit the transmission of engine vibration or impulses to the fan and conversely inhibit the transmission of fan flutter and unbalance back to the crankshaft. The proper fasteners must be self-locking without any frictional aid from bolt tension or seat pressure because the rubber mounts will flex constantly.

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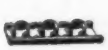
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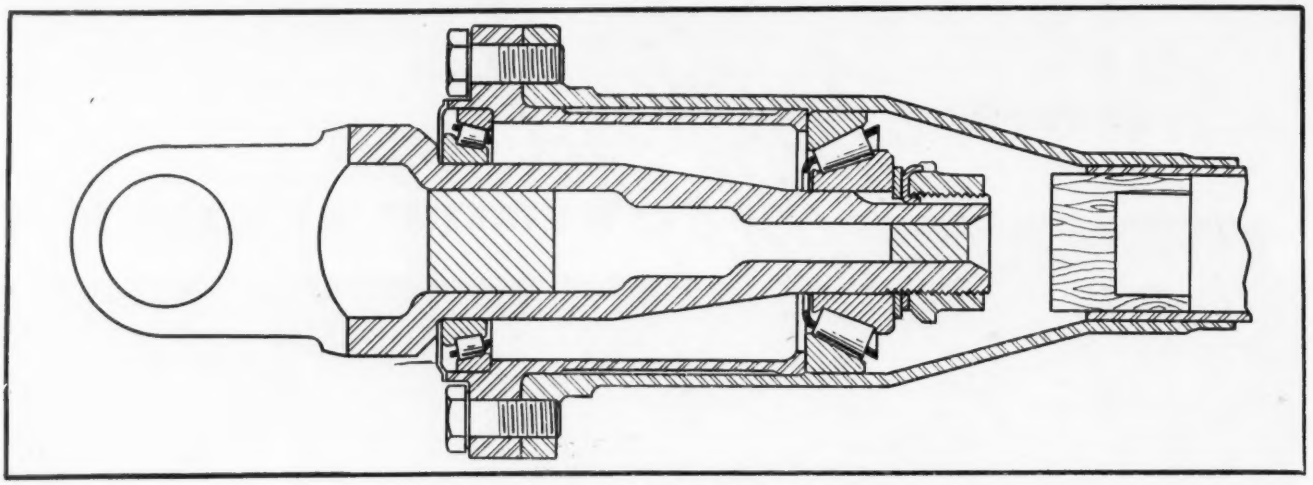


Fig. 1. Blade mounting with taper roller bearing.

Practical Engineering Of Rotary Wing Aircraft*

Blade attachment bearing factors are analyzed in this rotor hub study.

By HARRIS S. CAMPBELL, *Consultant to Autogiro Company of America*

Selection of rotor blade attachment bearings is preferably made in conjunction with design of the blade mounting parts (see author's analysis page 54 June *Aviation*). In this way an efficient solution for the various problems of loading, structure, and assembly may be developed.

Bearings which attach the blade for pitch movement are usually located outboard the drag and flapping pivots. These blade pitch bearings must retain blade against thrust developed by centrifugal force, and further, must have sufficient radial capacity to transmit such flapping and torque moments as may be developed during starting and stopping.

► **Blade Pitch Bearings**—There are many possible bearing arrangements for support of a blade for pitch change movements, as will be evident from some typical arrangements illustrated in Figs. 1, 2, and 3. (Reference is also made to Figs. 4 and 5 on pages 54 and 55 June *Aviation*.)

The roller type bearings will develop greater frictional moments than the ball thrust bearings illustrated in referenced Figs. 4 and 5. As shown in the latter illustration, one of the most desirable bearing assemblies for this purpose is believed to be an angular contact bearing arrangement. This type provides for efficient mounting structure, low frictional moments, and minimum blade root diameter because of the tandem bearing mounting.

Some approximate relative values of friction moments as determined from preliminary tests on several types of thrust bearings carrying the same oscillating load are discussed here.

Assume the value for angular contact ball bearings = 1.00, direct thrust ball bearings = .5, direct thrust roller bearings = 3.0, and tapered roller bearings = 2.0.

Regardless of particular design of bearing mounting used, it is always advisable to check with the manufacturers to obtain comments on, or approval of, application of loads and the bearing supporting structure.

For thrust bearings having an oscillating motion of small amplitude, the bearing capacity is usually lower than would be expected. Actual velocity of bearing motion is low, but the motion occurs continuously in a small concentrated area, which tends to cause a false brinelling or oxidizing action (called friction oxidation), particularly if proper lubrication is not provided. A lubricant having tough and penetrating characteristics, such as an extreme pressure lubricant, is preferred. This requires a suitably sealed chamber in which bearings are housed.

Since there is not a great deal of operating experience for highly loaded oscillating thrust bearing of the ball type only some general rules can be set up as a guide for their selection and mounting. Lubrication is highly important, and a free-flowing medium such as Gulf E.P. lubricant is preferred. If it is impractical in a particular design to provide for sealing in a low viscosity lubricant, grease may be used. With solid lubricant, the best results for this oscillating application have been obtained in tests with grease meeting Spec. AN-G-15. When a grease type lubricant is used, a bearing of slightly higher (approximately 15 to 20%) capacity should be used for a given load. Rigid bearing supports must be provided together with some means for adjustment to allow a slight preload to be applied to the thrust bearings. This eliminates all end play, which is detrimental to rotor blade thrust bearings.

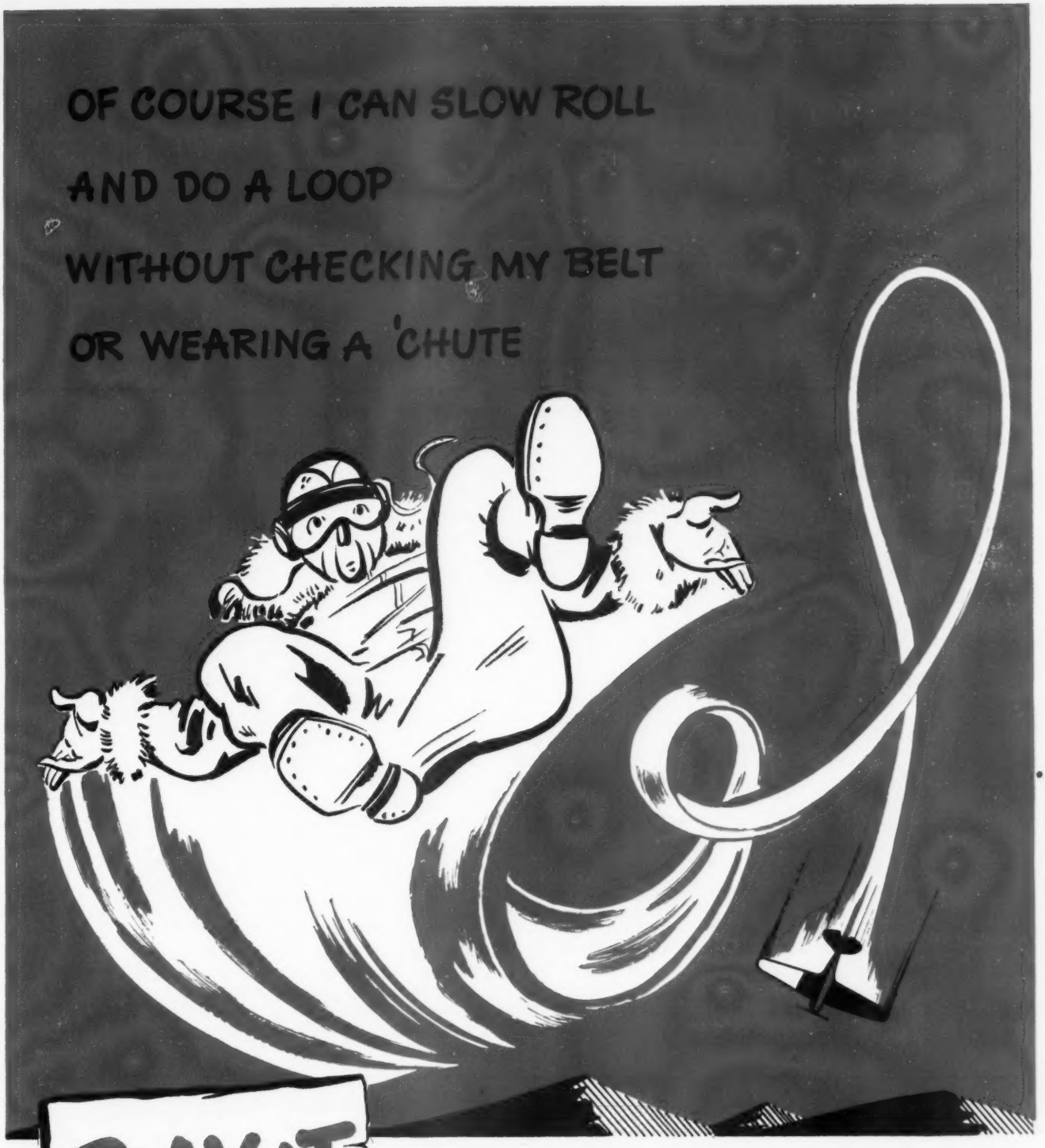
When angular contact bearings are used in tandem, they must be purchased in matched sets from the bearing manufacturer. Care should be exercised in mounting to make certain that bearings of each set are always mounted in proper relationship. As a design guide in selection of angular contact ball bearings for blade thrust loads, the following procedure is suggested: Determine rated thrust capacity for bearing to give an average life of 2,500 hr. at 500 rpm. Allowable oscillating operating load may be taken as approximately 60% of this capacity for light type bearings (7200 series), and 75 to 80% for medium type bearings (7300 series). Preliminary design may be based on this bearing selection. When two such bearings are used in tandem, capacity will be 190% of one bearing.

Upon completion of a design, it is recommended that it be submitted to bearing manufacturer for approval, and a test unit be made up with the selected bearing mounted as called for by the design. Test on the unit should include bearing operating thrust applied while the bearing mounting is oscillated through an amplitude of 3 or 4 deg. Test should be made for a period to give same approximate number of cycles as will be developed during minimum life expected of bearings, for example, 500 hr. operation at normal rpm.

Direct thrust ball bearings may be selected by using their 200-rpm. capacity as allowable thrust operating load.

For tapered roller bearings of steep angle type, some limited experience and tests have indicated that satisfactory oscillating thrust life is given by using 2½ times the 500-rpm. allowable load for the life desired. Until more extensive tests have been made and more accurate design information is available from bearing manufacturers on this type of bearing application, the foregoing method of selecting bearing sizes should give reasonably

* This complements material presented in a series of articles under this same title, running from July '46 to June '47, in *Aviation*.



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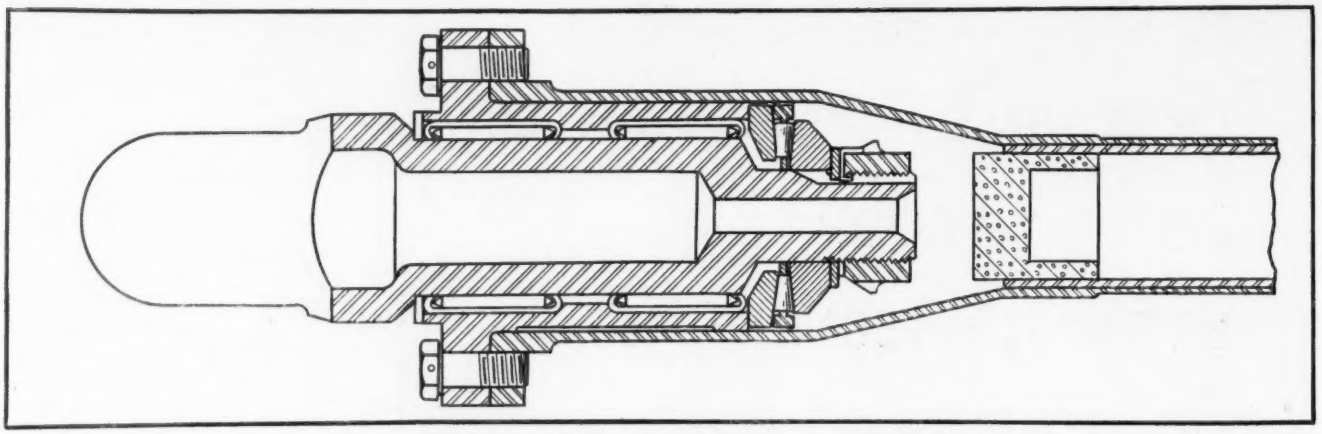


Fig. 2. Mounting utilizing direct thrust taper roller bearing.

satisfactory results, provided rigid supports are supplied for mounting the bearing installations.

In addition to thrust loads, blade pitch mounting must be able to carry radial loads from bending moments, particularly during starting. Angular contact ball bearings and tapered roller bearings can carry a combination of thrust and radial loads. Radial capacity will be determined from the brinell capacity, which must be sufficient to carry the limit bearing loads developed. When blade thrust is carried by angular contact ball bearings, use of a large-diameter light-type bearing at inboard end of blade sleeve (as illustrated in Fig. 5, June *Aviation*), provides an effective combination. Full type bearing is satisfactory for oscillating movement, and relatively large i.d. of bearing permits use of a large diameter pitch pivot axle member. Large diameter is desirable for efficiently transmitting blade moments developed during starting and flapping.

When direct thrust bearings are incorporated in the blade mounting, radial loads may be carried advantageously by needle roller bearings, as indicated in Figs. 2 and 3, this article. Bearings may be selected to provide a brinell capacity as great as or greater than limit load on bearings. Brinell capacity may be obtained from the catalog for particular type of bearing being used, or from bearing manufacturer.

Summarizing pertinent points in connection with mounting of blades on pitch bearings, the following should be noted: Only bearings of best quality should be used. Accurately machined and rigid bearing supports should be provided, and the bearings mounted with sufficient preload to remove all play. Whenever feasible, bearing chamber should be designed with seals suitable for retaining an E.P. type lubricant.

▶ **Drag Pivot Bearings**—Chief requirement of a drag pivot bearing is high capacity and compactness. Since a damping device is generally used to control drag movements, low frictional characteristics are not essential in the bearing. Needle type bearings are well fitted for this position because of their high radial capacity, compactness, and ease of lubrication. In most blade attachment designs there is very little axial thrust developed at the drag pivot. Hence a thrust washer is usually sufficient to transfer incidental end thrust loads.

Motion on drag pivot is a small amplitude oscillation for which the needle type bearing is well suited. Normal operating bearing pressures not over 5,000 psi. are considered most suitable, although in some cases loadings as high as 7,500 psi. have been used satisfactorily. Bearing area is based on actual contact length of rollers and diameter of inner race. Often, pivot pin is used directly as inner race to save space. To permit using full capacity of bearings in such designs, pin should be case-hardened to Rockwell reading of C-58 minimum. The engineer must also be careful to design the bearing pin and other adjacent parts with sufficient rigidity to prevent uneven distribution of bearing loads. A practical design method of calculating pin diameter and adjacent parts is given in June *Aviation*.

Another point to be considered in design of the drag mounting for a rotor blade, is that pivot bearings usually are required to transmit loads from moments under some conditions, such as blade-weight moments. To keep bearing loads due to such moments low, it is desirable to provide two separate bearings which are spaced as far apart as is feasible.

Drag pivot bearings must also be checked for their brinell capacity. Most bearing catalogs list maximum non-brinell capacity—usually 20,000 to 25,000 psi. for high quality bearings. To determine margin of safety under brinelling condition, maximum limit load calculated for the bearing should be used. This limit load should not exceed static non-brinell capacity.

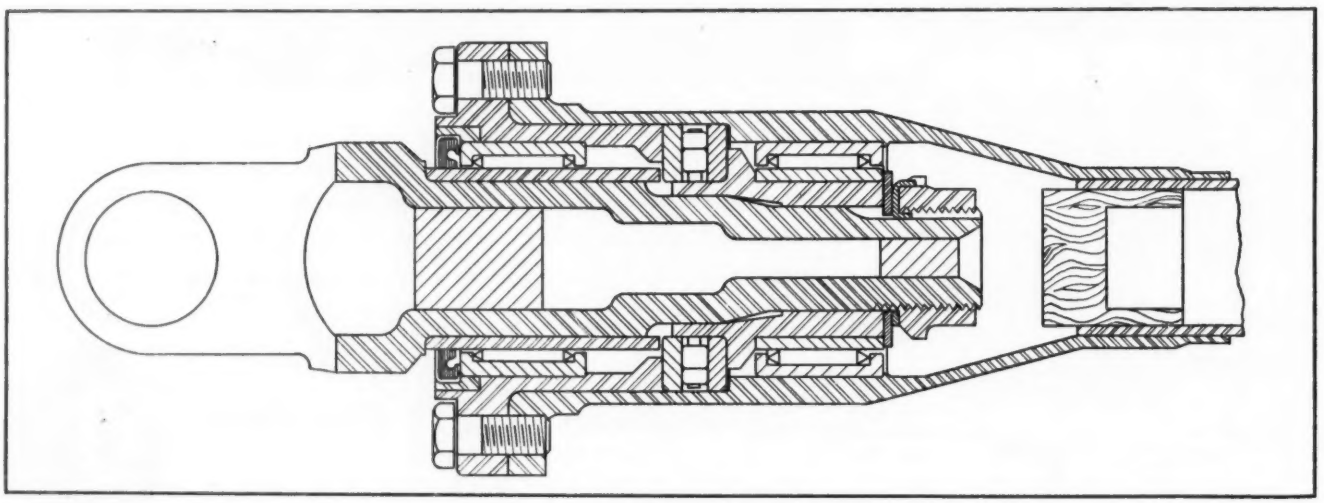
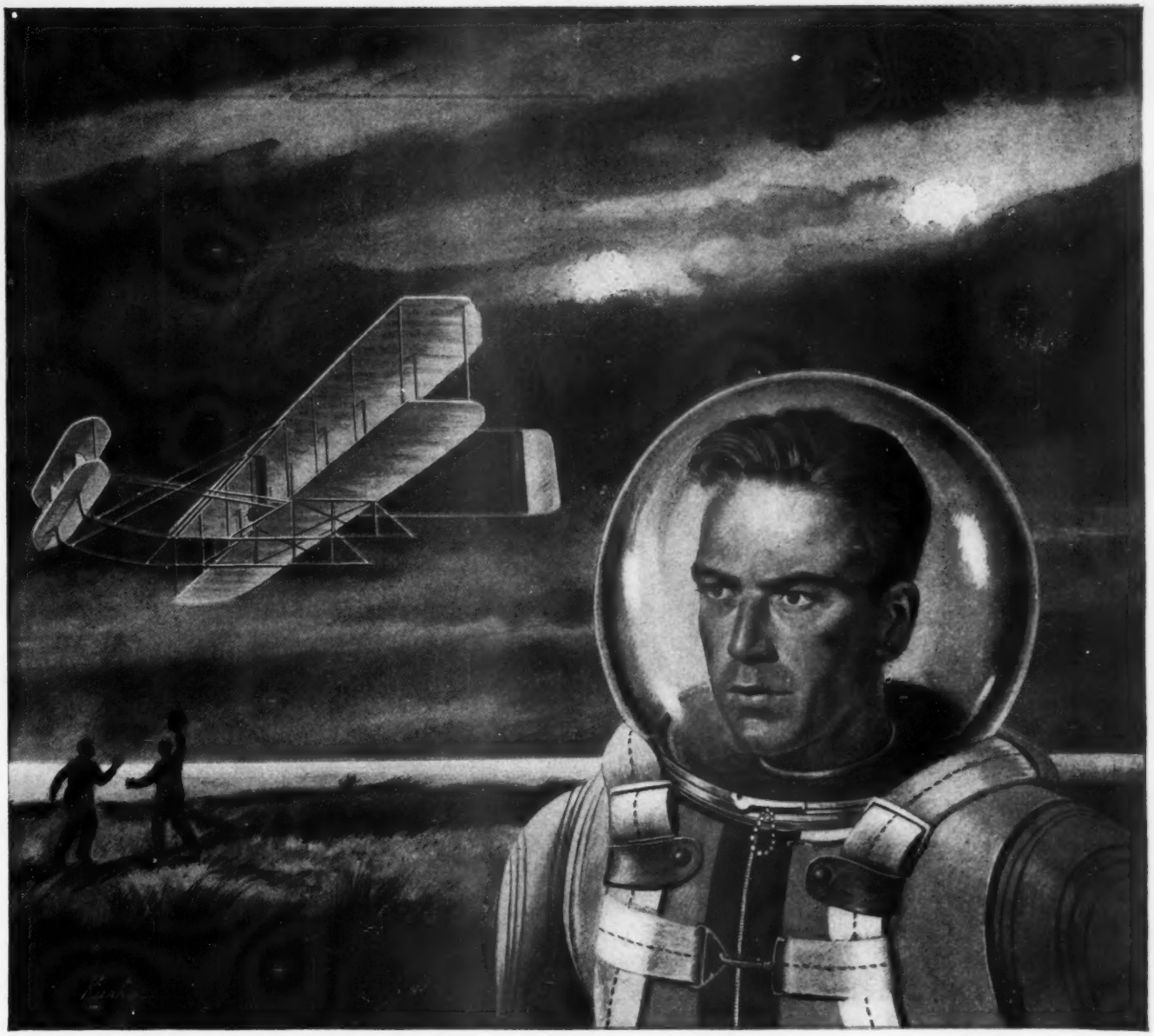


Fig. 3. Arrangement using direct roller thrust bearing.



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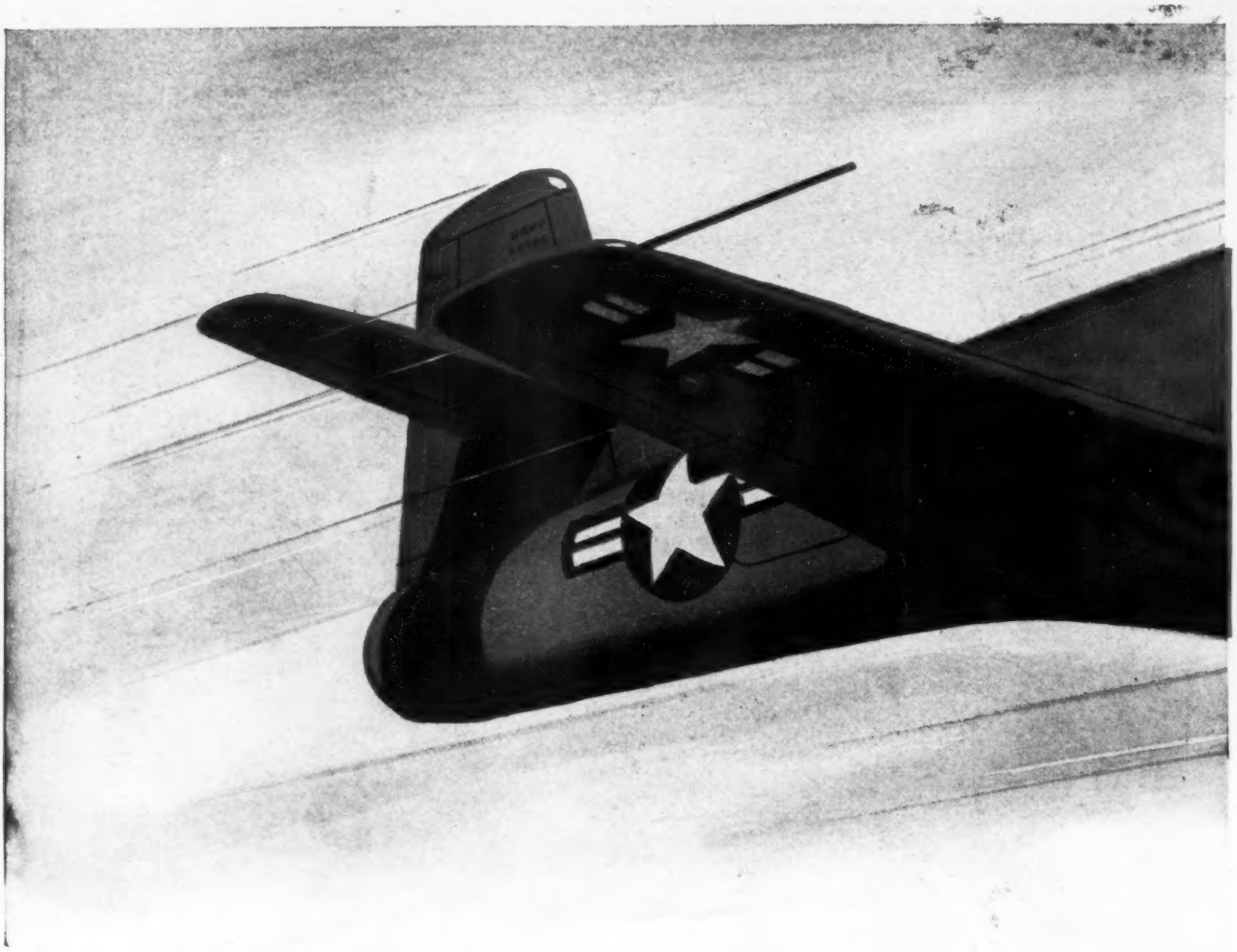

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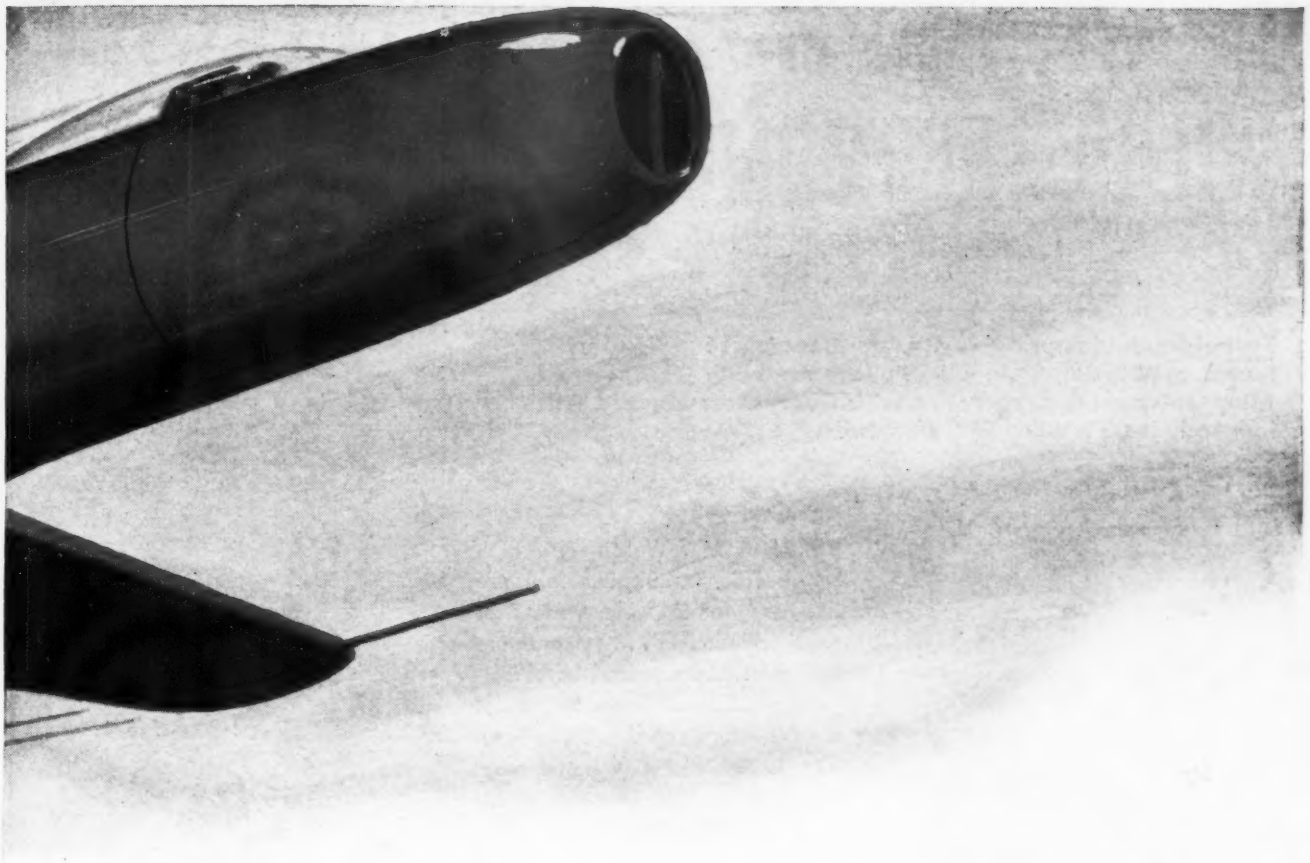

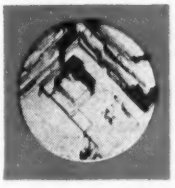

NO MAN KNOWS what lies in wait for aircraft in the mystery land called the Trans-Sonic Range. Only way to find out is to send a man—and a ship—through the Sonic Barrier.

This is a little of the story of that ship. Its name is Navy Douglas SKYSTREAK. Built for BuAer, Navy, with NACA counsel. The story is one of knowns and unknowns.

Among the knowns is the high strength of Alcoa Aluminum Alloy 75S. Nine years of development, of test, of studying photomicrographs of grain structure, were required to produce it . . . a Flightmetal with the *lightness to fly*, the *strength* to challenge the unknowns.

Unknowns like the slashing, tearing, buffeting forces of air, maddened by motion as the speed of sound is approached, equaled, exceeded. In this uncharted range, will an airplane "tuck under", or can longitudinal stability be maintained? Will trailing edge vibrations mount through the flutter stage to a vicious *buzz?* Will snaking cause directional oscillations no man-made controls can conquer?

These are the questions that challenge Navy men and Douglas men at the point where Engineering stops and Imagineering must take over. Questions of fuselage frames machined from *2" plate*, of magnesium skin on fuselage, of elevator leading edge machined from *solid bar*. Questions that have prompted an almost continuous interchange of technical data on Alcoa Aluminum and Magnesium between Alcoa and Douglas—and periodic group meetings on the Flightmetals, in which Alcoa engineers have spent hour after hour in discussion with Douglas structural, design, process, stress, and other engineers.

In such meetings, in the course of such continuous contact, Alcoa has learned, through the years, the needs of the aircraft industry, the directions that Alcoa Research and Development should take. The ways to give the Flightmetals—Alcoa Aluminum and Magnesium—the characteristics demanded in military, and commercial, and private planes.

Like milestones along the way, are the aircraft thus produced. The SKYSTREAK, *stressed for eighteen G's*. Others, built for speed, or load, or country week ends. Each, insofar as Alcoa materials and facilities and know-how can contribute, using the right Flightmetals, in the right form, in the right place. ALUMINUM COMPANY OF AMERICA, 2182 Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in principal cities.

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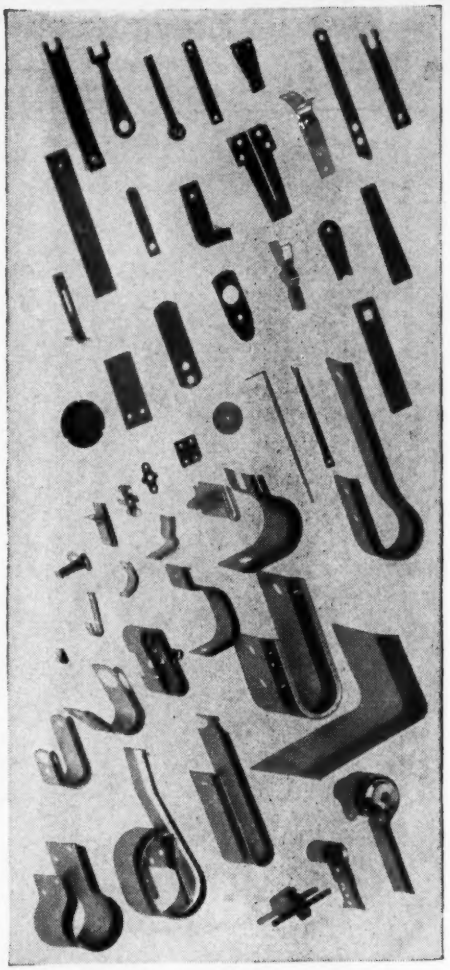

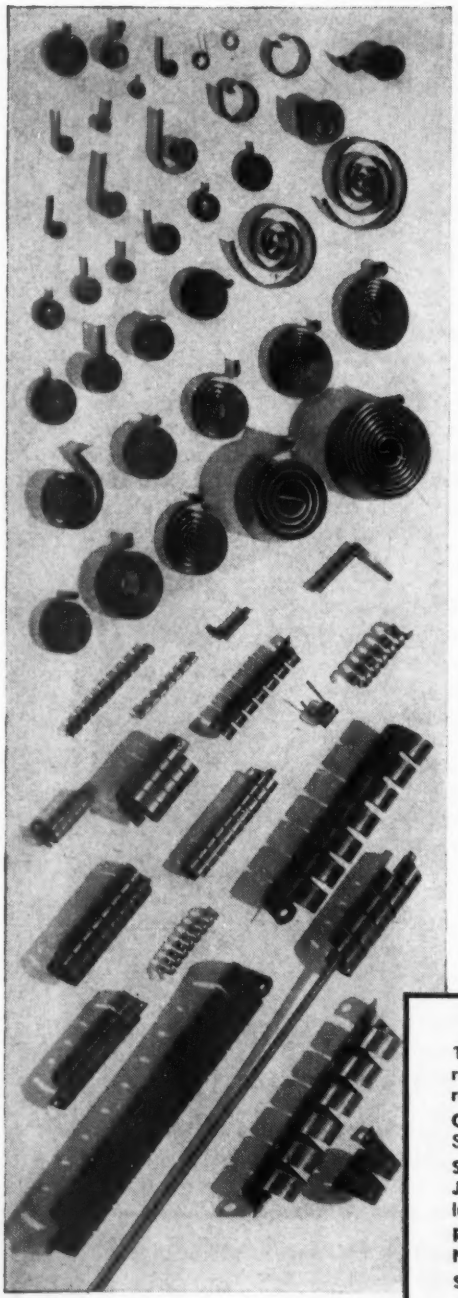

VERSATILITY—Wilco Thermometals (Thermostatic Bimetals) are designed for a wide variety of functions including . . . Temperature Indication (thermometer) . . Temperature Control (room thermostat or hot water heater) . . . Temperature Compensation (voltage regulators and various other instruments) . . . Control of a Function with temperature change over a range of temperatures or by auxiliary heating of the Thermometal.

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British Test New Jet Fighter

SARO flying boat exhibits speedy take-off characteristics during initial flights in England.

Successful flight tests of the world's first jet-propelled flying boat, the Saunders-Roe SR-A-1, indicate that it will achieve its 500 mph. design top speed without difficulty. Tests to date have been held to the 400 mph.-mark by Geoffrey Tyson, SARO chief test pilot, with water-handling characteristics and general stability and control receiving the greatest test emphasis.

The craft has been airborne repeatedly in 10 seconds, about one-third the time required for propeller-driven flying boats and about one-sixth that of four-engined flying boats. This short takeoff time is considered exceptional in view of the jet power of the craft, which produces slow aircraft takeoff times. The A-1 lands at about 100 mph., according to test reports.

► **Twin Jet Power**—The single-seat fighter is powered by two Metropolitan-Vickers F 2/4 Beryl axial-flow turbojet engines developing 3500 lb. of thrust each. They are mounted side-by-side near the fuselage centerline, permitting single-engine operation with a minimum effect on directional stability of the airplane. This permits one engine to be shut down for long-range flying and preserves normal control in the event of an engine failure in flight. The air intake is located in the extreme nose, clear of normal spray, and contains a water trap to prevent the entrance of water in heavy seas.

Cabin is pressurized and fitted with a pilot ejector seat. The wing is built up on a single spar with chordwise stiffeners, rather than the spanwise stiffeners predominating in this country. This system places the greatest portion of the loads in the skin, while these loads are carried substantially by the stiffeners in American practice. Wing floats are retractable inboard, a portion of the float remaining below the thin, high-speed wing in the stowed position. Four 20 mm. cannon are mounted in the nose on either side of the air intake.

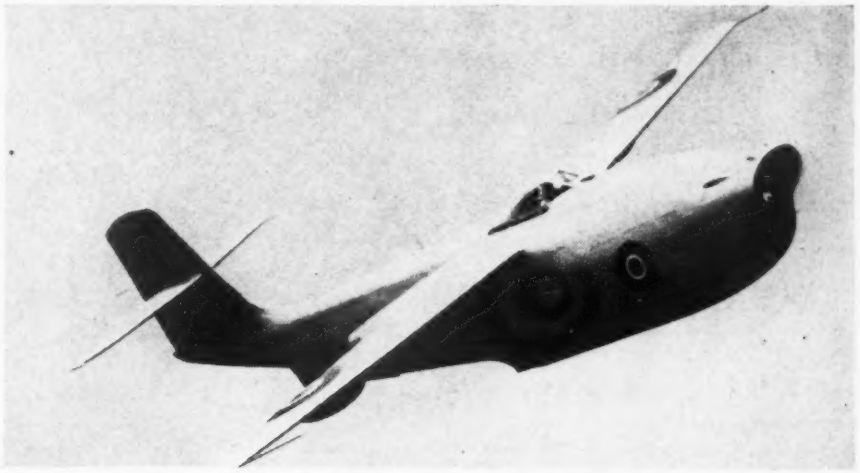
► **New Mooring Hook**—The problem of mooring and water-handling of the A-1 has been solved by special SARO mooring hook equipment remotely operated by the pilot from his seat in the cockpit, thereby making mooring crews unnecessary.

The jet-propelled flying boat single-seat fighter offers numerous tactical advantages over the carrier-borne or land-based fighter, chiefly its independence of landing fields.

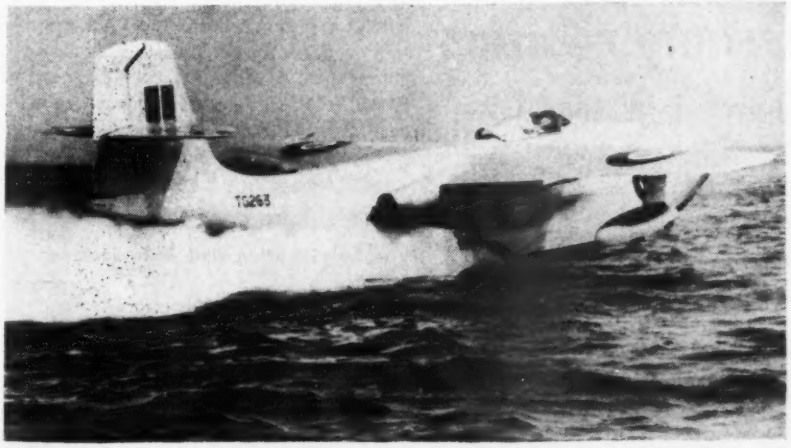
The U. S. Navy experimented with single-seat flying boats designed by Igor Sikorsky and Grover Loening in the early thirties but abandoned them due to their comparatively poor performance. Claims that these interesting planes were underpowered now seem justified and turbojet engine has overcome any such disadvantage. The Navy is currently pressing completion of the Convair Skate, a swept-wing small flying boat with 7500 lb. thrust jet units. The craft carries a crew of two or three, depending upon its use.

Specifications SR-A-1

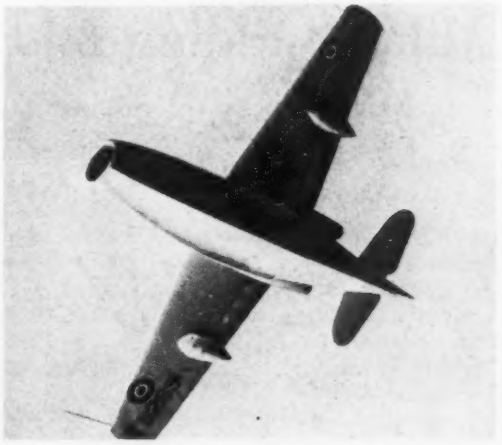
Span	46 ft.
Length	50 ft.
Height	17 ft.
Wing area	415 sq. ft.
Aspect ratio	5.1
Hull beam	6.83 ft.
Max. speed	500 mph.
Landing speed	100 mph.
Takeoff time	10 sec.



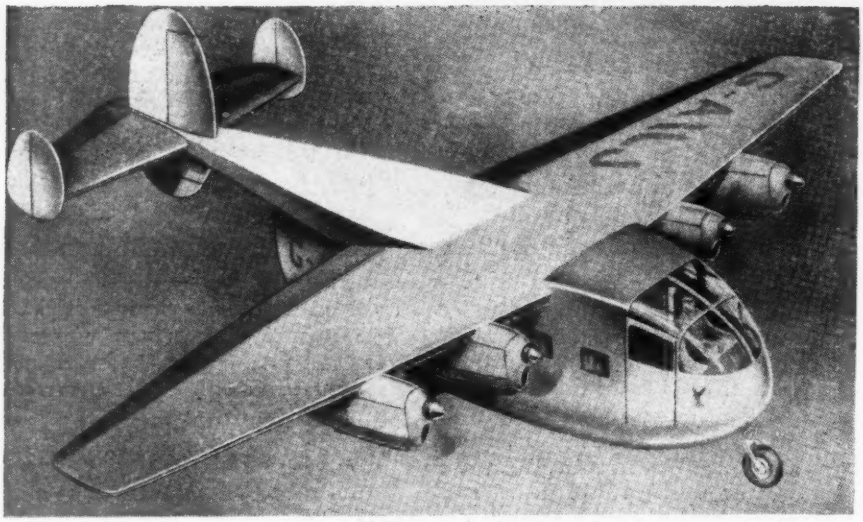
Closeup flight shot of SA-A1 clearly shows air intakes in nose. Water trap is installed for rough water handling. Note 20-mm. cannon ports. (British Combine photo)



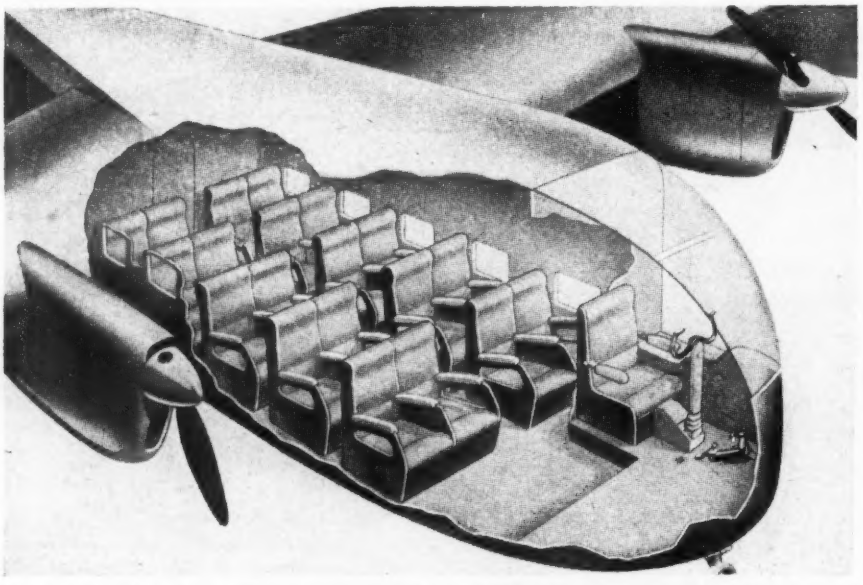
Leaving water on flight test is Saunders-Roe SR-A1, first jet propelled flying boat. Powered by two Metropolitan-Vickers F2/4 turbojets of 3,500-lb. thrust each, fighter's design top speed is near 500 mph. Span of craft is 46 ft., length is 50 ft., and height is 17 ft. Pilot's cockpit is pressurized and is equipped with ejector seat. Armament consists of four 20-mm. cannon. (IN photo)



Wing floats retract up against wing of new British jet flying boat. Note wide air intake and sharply defined hull lines. Craft is reported able to cruise comfortably on one engine, thus boosting range considerably. (British Combine photo)



Artist's conception of Miles Merchantman, prototype of which is under construction. Developed from Miles' twin engine Aerovan, Merchantman can be adapted for either cargo or passenger carrying.



Cutaway drawing shows 20-passenger capacity of Miles Merchantman, normally operated with single pilot. Radio operator's seat can be installed on right side of cabin. Company says craft can be converted to cargo version in matter of 10 min.

Miles Building 20-Passenger Liner

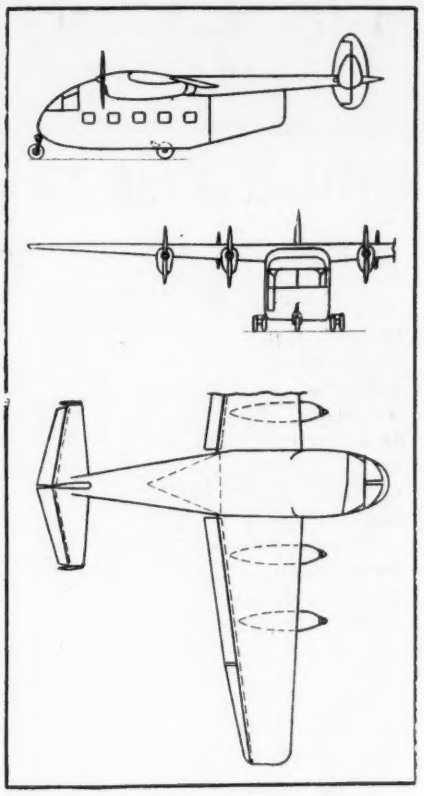
New all-metal Merchantman, powered by four Gipsy Queen 30s, can be converted to 2-ton cargo craft in approximately 10 minutes.

Miles Aircraft Ltd. of England is constructing the prototype of its Merchantman, a four-engine, 20-passenger or 2-ton cargo craft developed from its twin engine all-wood Aerovan.

Merchantman's general arrangement is much like Aerovan's—a high wing monoplane with a single boom extending aft from the fuselage to support the empennage. Fixed tricycle landing gear keeps reinforced cabin floor level when the plane is on the ground so that a short ramp is sufficient for loading through the wide rear doors.

The cantelever wing is of simple construction, built around a single spar, and is built in three sections to facilitate repair or packing for shipment. The center section carries all four engines, and outer panels are quickly detachable. Miles auxiliary flaps are fitted, and ailerons are coupled to the electric flap actuator to give maximum takeoff or landing lift. To simplify construction, the flaps are not retraceable, being suspended below the wing. Crash-proof fuel tanks have total capacity of 250 gal.

Main landing gear has double wheels which permits duplication of the braking system with interchangeability of all wheels



and tires. Oleos are accessible from inside the cabin. The nose wheel can be connected to the rudder bar for ground handling.

Main cabin has total capacity of 780 cu. ft., with inside dimensions as follows: length, 18 ft., width, 7 ft. x 3 in., minimum height, 6 ft. 6 in. Flooring is stressed for concentrated loads, and cargo tiedown or passenger seat attachments are provided. Company reports the craft can be changed from cargo to passenger version in approximately 10 min.

Steel tube engine mounts are designed to take either Gipsy Queen II or Gipsy Queen 30 engines, with either power unit using constant speed propellers. Electric starting on a 24-v. system is provided.

The company says "it was decided to use four power units rather than two of equivalent power, primarily to meet the spirit as well as the letter of the ICAO takeoff requirements in regard to engine failure on takeoff. We are confident that the Merchantman will exceed handsomely all the ICAO requirements, and, in fact, should be able to take off on full load from the start with one motor stopped."

Specification and data include:

Span	66 ft. 6 in.
Length	42 ft. 9 in.
Height	14 ft. 3 in.
Wing area	600 sq. ft.
Height of cabin floor from ground	2 ft.
Gross wt.	13,00 lb.
Payload (with 100 gal. fuel)	5,000 lb.
Takeoff wing loading	22 lb./sq. ft.
Max. fuel capacity	250 gal.
Rate of climb (sea level)	1180 fpm.
Service ceiling	15,800 ft.
Absolute ceiling	17,400 ft.
High speed, sea level	163 mph.
Cruising, max.	152 mph. at 2200 ft.
Cruising, 65% power	136 mph.
Max. range, 5,000 ft	860 mi.
Takeoff run to clear 50-ft. obstacle, 5-mph. wind	440 yd.
Stalling speed, flaps down	60 mph.

Belgium Offers New Tipsy Junior

Wood-fabric trainer stressed for 25-60 hp. engines to give varied performance for students seeking low-cost operation. Prototype flown with open cockpit, but builders report bubble canopy can be fitted.

Designed to give students the cheapest possible flying time is the new Tipsy Junior, built by Avions Tipsy of Belgium. Company reports it is the first craft completely designed since the war, since its Belfair and Trainer had been started before the conflict.

A single place low wing monoplane with fixed conventional landing gear, the Junior can be equipped with engines ranging from 25 to 60 hp., giving it maximum speed range of from 90 to 125 mph.

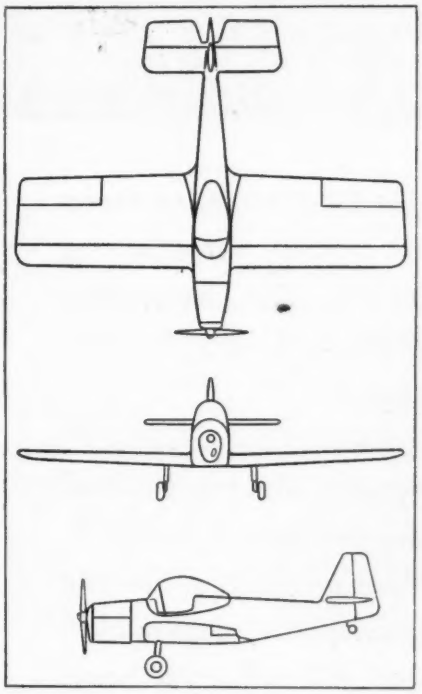
The wing—which has no taper—has two wood spars, a main and auxiliary, with torsional rigidity maintained by a box formed by the front main spar and the plywood leading edge. Covering aft of the front spar is fabric, as is covering on the ailerons.

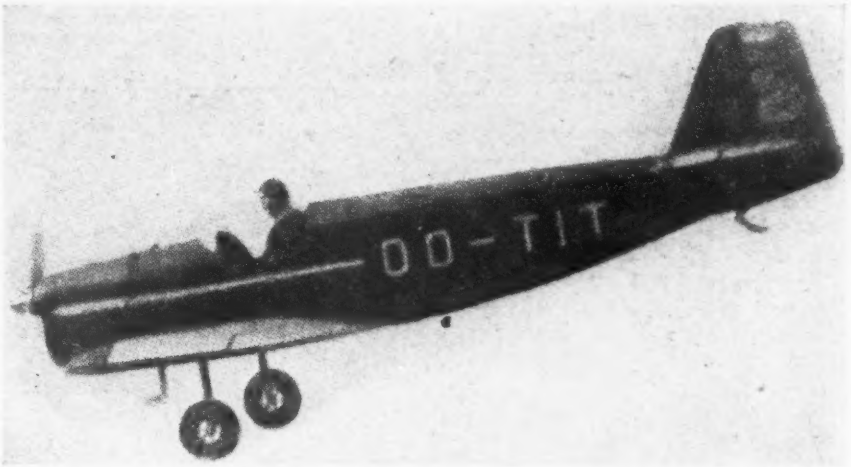
Fuselage is also of wood, the main members being longitudinal trusses joined by large gussets. Streamlining is achieved through tubular members and wood stringers supporting the fabric covering.

Fin, rudder, stabilizer and elevators are all wood-frame members with fabric covering.

Main landing gear consists of cantilever tubes attached to the main spar, with friction-damped spring suspension to absorb shock. For a craft of its size the 5 ft. 11-in. landing gear tread is quite wide. A swiveling tail wheel is to be provided on production models, although first flights of the prototype have been made with a skid.

While initial flights have been made with an open cockpit, a bubble type canopy can be provided, the builders report.





Demonstration flights of Tipsy Junior with 60-hp. engine are reported to have shown outstanding performance, including takeoff run of about 200 ft., climb of 1,200 fpm. and high speed of 125 mph. (Flight photo)

Specification and data include:

Span	22 ft. 7 in.
Length	17 ft. 10 in.
Height (in 3-point position)	4 ft. 10 in.
Wing area	113 sq. ft.
Gross wt. (with 65-hp. engine)	660 lb.
Empty wt. (with 65-hp. engine)	403 lb.

Performance

	25-hp. engine	60-hp. engine
High speed	90 mph.	125 mph.
Cruising speed	72 mph.	113 mph.
Landing speed	35 mph.	40 mph.
Takeoff run	525 ft.	198 ft.
Climb (sea level)	465 fpm.	1,200 fpm.
Service ceiling	10,150 ft.	21,650 ft.
Range	375 mi.	375 mi.

Avions Tipsy Junior—designed for inexpensive time-building—is called Belgium's first completely-postwar craft. Craft is designed to take engines ranging from 25 to 60 hp. to give wide range of operating costs and performance. (Flight photo)

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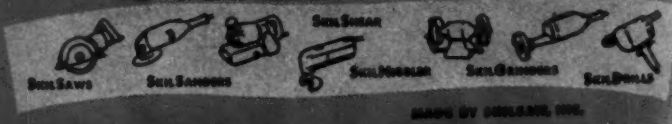

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IAS Meet Spotlights Jet Transport Design Race

Douglas, Lockheed present operating specifications and economic data on turbine-powered carriers held feasible for commercial operation.

Should jet transports now prove to be actually "just around the corner," the Institute of Aeronautical Sciences may well lay historic claim to having hastened the day.

For its 15th annual summer meeting, held in Los Angeles Aug. 7-8, the Institute was able to persuade two of the world's foremost airframe builders to hold up for public viewing the economic data and operational specifications of jet carriers they believe can be built and flown successfully.

Previously, and without exception, every U. S. aircraft manufacturer has shunned, as if a plague might ensue, any discussion that would hint immediate interest in jet transport designing.

Douglas and Lockheed were the companies that dared to break the precedent of silence, and it is safe to predict their competitors now will be forced to put their own ideas into print and send their salesmen out to knock at the doors of world airlines. This is not to be taken as an indication that any manufacturer will roll a 550-mph. jet transport out of his shop three years from now.

But it is certain that as a result of what happened in Los Angeles the airlines will want to know the identity of transport makers who are preparing today for the jet-building race that appears to be inevitable. It is too early to ascertain British reaction, as a transport building competitor, to America.

▶ **Keen British Interest**—However, British observers at the IAS. meeting were among the first to scoop up copies of "Analysis for Optimum Transport Airplane Configurations" (digested in this article) presented by Philip A. Colman, Lockheed's chief aerodynamics engineer; and "Operational Aerodynamics of High Speed Transport Aircraft" offered by R. S. Shevell, performance engineer of Douglas Aircraft Co.

These, highlighting the reading of eleven technical papers dealing for the most part with missile and aircraft supersonic and high subsonic research, gave the Institute meeting a fine flavor of planning for the future.

It was augmented, too, by the distinct novelty of having a civilian called upon to receive one of the industry's top engineering honors, the Thurman H. Bane Award, previously presented only to military personnel.

Stocky, gray-haired Adolph L. (Doc) Berger, civilian power plant mechanical engineer at Wright Field, was given the Bane Award for his outstanding leadership in developing ceramic materials lengthening the life of military aircraft engines—both turbojet and ramjet—under excessive operating temperatures. It was under his research guidance that universities and commercial laboratories conceived ceramics that would protect low-alloy metals from destruction by high-velocity gases at temperatures ranging up to more than 5,000 deg. F.

▶ **Northrop on Flying Wings**—To many of the 400 who attended the institute sessions, John K. Northrop's re-delivery, for the first time in this country, of the 25th Annual Wilbur Wright Memorial Lecture delivered in London was outstanding.

Few reviews of his original delivery of the lecture had caught the significance of many of his predictive observations in tracing the history of all-wing aircraft development. His evaluation of the efficiency of the all-wing design (see table) and estimate of the utility of the delta wing with diamond-section airfoil (see sketch) for supersonic aircraft if wing loading can be held to 40 lb. per sq. ft. previously had received scant publication.

Particularly among younger engineer-members of the Institute, the potential commercial application of jet power envisioned by the Lockheed and Douglas speakers made the Los Angeles meeting a significant one.

Their imaginations had been whetted by a preceding field trip to Muroc Army Air Base to witness jet bomber and fighter test flights. And in conclusion they visited the California Cooperative Wind Tunnel to witness the testing of an aircraft model at a reading of Mach .93.

Concensus of feeling was that the starting gate had been raised for a jet transport design race, and that Lockheed and Douglas had taken the lead from all other U. S. competitors who might be equally advanced in designing for the future but who have shied from disclosing plans that might jeopardize conventional plane sales if it were not made clear that (1) neither airlines nor manufacturers today have the funds to initiate actual construction of a jet transport, and (2) present jet engines do not offer the efficiency demanded for commercial jet aircraft.

In his paper, Mr. Colman presented a table of airplanes to perform typical cargo transport jobs; showing the effect of three variables (range, payload, and cruising speed) on size, utility, and economy of cargo plane designs. Variables discussed were: range 1,500-3,000 mi., payloads of 20,000, 50,000 and 100,000 lb. Powerplants compared were: supercharged piston engines; turboprops, and turbojets.

The airplane is considered only for transport of cargo. Internal volume for a unit weight of cargo followed current practice, evidenced by modern design trends.

▶ **Evaluation Basis**—Engine power, size, weight, and fuel consumption characteristics are based on current practice, and do not depend on future developments. Airplane configuration is conventional and wing aspect ratio, wing loading, and relative tail length and area are held at typical constant values.

Flight safety is considered by maintaining a favorable value of the product of wing loading times power loading, assuming equivalent lift and propulsive efficiency will be realized for all resulting designs. Thus equal takeoff distances are maintained.

All aircraft are designed for cruising altitude of 30,000 ft., this is to the benefit of the turbos, but the disadvantage to piston type engine is relatively slight.

▶ **Installation**—Nacelle or engine installation frontal area which effects drag depends on

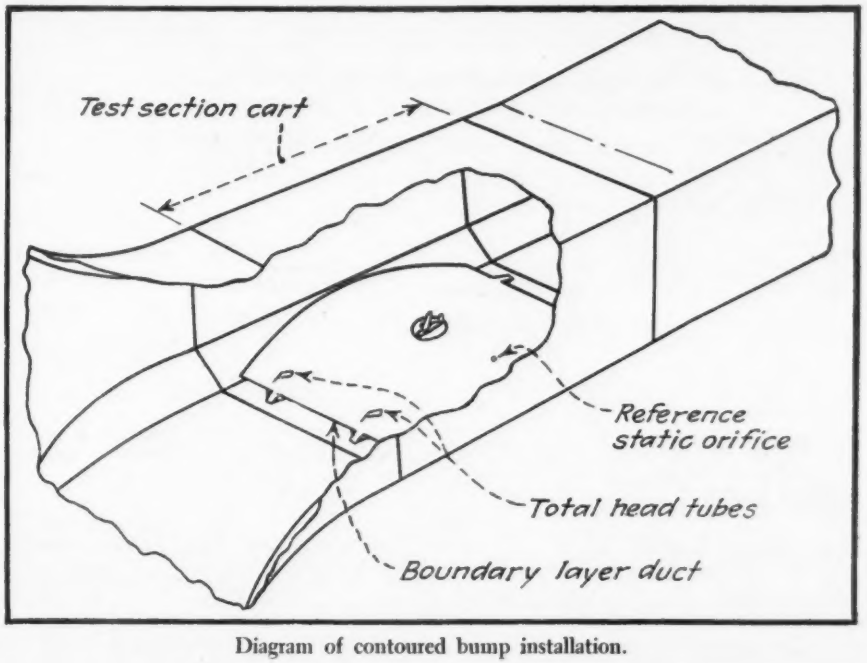


Diagram of contoured bump installation.

type and size of engine considered. For each type, typical installations have been studied to arrive at values for frontal area per take-off brake horsepower (BHP). Reciprocating and turboprop engines are assumed to be housed in standard type nacelles; jet engines are assumed to be partially buried in structure and to have equivalent frontal areas.

Airplanes equipped with reciprocating engines are larger and heavier than those equipped with turboprops for all ranges and conditions, due to the fact that power ratings relative to power weight and size, and the ratio of maximum cruise power to take-off power, are in favor of the turboprop. The advantage in specific fuel consumption which the present piston type engine has over the turboprop is not great enough to overcome its other disadvantages for ranges considered.

Turbojet engine today is not capable of powering an airplane designed to accomplish the longest range jobs listed; for shorter range the jet airplane is more efficient at intermediate speed than at lower speed; for short range intermediate and high speed, the jet plane is superior in size to the piston driven plane; for short range at highest speed, the jet powered craft is superior to either of the other powerplants.

► **Altitude Performance**—In order to obtain maximum capabilities of a turbojet engine it is necessary not to restrict the cruising altitude because optimum performance is obtained by continually increasing altitude as weight decreases during flight.

It is recognized that all three types of engines will be considerably improved in the future but the author feels that if relative advantatges are changed, the result will further favor turbo engines.

The accompanying table illustrates that: largest engines are not always required; a large number of jet units are required; carrying large payloads at the highest speed requires higher powered units; dividing gross weight into three components, jet planes have relatively lower airframe weight and higher fuel weight. The percent payload weight to gross weight is relatively low for high speed jet planes; effect of increasing payload required is to increase ratio of airframe weight to gross weight, (ratio of fuel weight to gross weight is affected very little); increasing required payload, range, or speed, decreased ratio of payload to gross weight, Mr. Colman said.

History indicates that speed is desirable due to man's insistence for saving time, even though it is shown to be more expensive. Geographical location of airports prescribe range requirements, and such operational factors often disprove the most scientifically deduced aircraft optimum.

► **Jet Superiority**—In conclusion the following facts were brought out:

1. The most efficient plane designed for 20,000 lb. payload at slowest speed closely parallels currently desired airline cargo type.

2. For the longer range, intermediate speed, 20,000 lb. payload class, an airplane of 98,000 lb. gross weight powered by four 3,000 bhp. engines evolves. This is Lockheed Constellation size aircraft, with slightly higher performance because of assumed use of turboprops.

3. 50,000 lb. payload class closely approximates the Lockheed Constitution. Four engines at 5,200 bhp., results in a gross weight of 223,000 lb., for 3,000 mile range.

4. 20,000 lb. payload, short range, 475 mph. jet transport is entirely practical. A gross weight of 108,000 lb. is required with takeoff thrust at 31,000 lb.

Also reported was "A Method of Wind Tunnel Testing Through the Transonic Range," by John H. Weaver, Lockheed Aircraft Corp. Described was a bump testing technique developed because choking phenomenon between model and airstream boundaries did not permit use of conventional tunnels to obtain continuous data through speed of sound. Method—expected to afford close prediction of true flight characteristics—consists of installing contoured bump in subsonic tunnel to obtain supersonic velocity region over bump, where half-span model can be mounted vertically.

► **Bump installation** is shown in accompanying sketch. A 1/22 scale model of Southern California Cooperative Wind Tunnel was used, having entrance cone, test section, diffuser, and centrifugal blower. Bump contour was developed by cut-and-try processes and these practical factors influenced bump's overall size and shape: Length could not exceed 15 ft. for confining to removable cart forming tunnel test section; thickness had to be sufficient to house strain-gage balance system and remotely controlled angle-changing apparatus; and models tested would have 5 to 8-in. semispan wings.

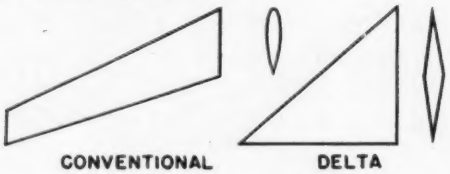
Preliminary tests in model tunnel indicated that magnitude of local Mach number and vertical velocity gradient above bump contour were controlled primarily by ratio of bump thickness to tunnel height. Obtaining small velocity gradients both vertically and horizontally was considered more important than high testing speeds, hence final bump contour was obtained by modifying circular arc contour of proper thickness to give maximum local Mach number of about 1.2 at centerline. Thick boundary layer next to tunnel walls was ducted under bump so as not to interfere with tests.

Somewhat large pressure differentials were induced at various points in tunnel test section because of bump installation, hence the small tunnel tests were helpful in determining where test section structure had to be strengthened to carry bump loads.

► **Balance System**—To make 6-component strain gage balance system simple and reliable, entire balance unit and model were rotated for angles of attack changes, so that balance measured airplane axis forces and moments which had to be transferred to conventional wind axis in data reduction. Turntable (16-in) was provided through which models passed with small clearances so that only air loads on model were measured by balance system.

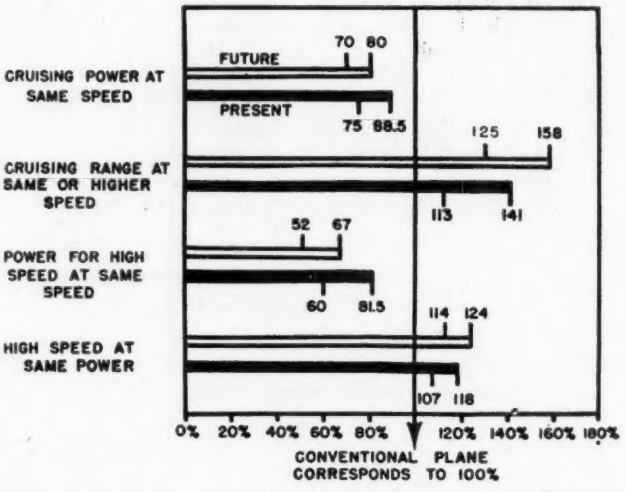
► **Bump Velocity Survey**—Vertical pressure plate was installed having flush orifices cover-

COMPARISON OF SUBSONIC AND SUPERSONIC ALL-WING AIRPLANES



TYPE	CONVENTIONAL	DELTA
THICKNESS AT ROOT	1	1
TAPER RATIO	2:1	∞
THICKNESS RATIO	15%	7½%
ASPECT RATIO	8	4.5
ROOT CHORD RATIO	1	2
SPAN RATIO	1	.75
VOLUME RATIO	1	.833

GRAPH OF PERFORMANCE CHARACTERISTICS OF ALL WING AIRPLANE



ing area 10 in. above bump and 8 in. fore and aft of maximum ordinate. Flush reference static orifice was installed approximately 3 ft. to side of bump centerline, and two total head tubes mounted forward in the subsonic flow region. Calibration curve was obtained of average Mach number at model vs. Mach number indicated by reference tube.

The boundary layer profile at the model location was measured with total head rake. To account for 0.6-in. thick boundary layer, zero stations of models were moved out .2 in. from bump contour and all coefficients based on model dimensions outside this .2-in. station.

▶ **Testing Technique**—Best operating technique decided upon was that of setting constant value of $\frac{1}{2}\rho V^2 = 500$ lb./sq. ft. for all Mach numbers tested. This could be done conveniently because of tunnel's variable pressure feature. Advantages were that data reduction was simplified, allowing plots of final corrected coefficients to be made while test was in progress; and sensitivity of balance system gave same accuracy to coefficients for all Mach numbers.

▶ **Test Data**—Graphs were obtained showing effect of Mach number on P-80 wing (alone) data at constant values of C_L. Large change in zero lift angle and accompanying C_M changes were apparently due to airfoil section chamber causing unsymmetrical shock formation on upper and lower surfaces. Above $M = .975$, coefficients stabilized again with aerodynamic center of wing shifted aft to 40% MAC and zero lift angle shifted to 0 deg.

Because tests on models mounted by conventional methods in high speed wind tunnels have shown considerable hysteresis in coefficients as Mach number was increased or decreased above wing critical, similar test was condiucted on P-80 wing on bump with no effect, indicating that hysteresis is tunnel blocking phenomenon, not likely to occur in flight.

Also found was that leading edge angle has four effects on C_D vs. M—(1) knee of drag curves move toward higher values of M as sweepback angle increases. Variation is fairly close to proportional to square root of cosine of angle; (2) slope of drag coefficient rise before knee curve decreases with increasing leading edge angle; (3) slope of rise after knee decreases with increasing angle; and (4) peak drag coefficient decreases with increasing angle. Pronounced effect was noticed on smoothness of balance readings above critical Mach for wings with more leading edge angle.

Gain in critical Mach number for all values of C_L tested was realized for given planform wing by sweeping maximum thickness line.

Results on fuselage and horizontal tails on models indicated that test method will be useful in determining interference effects and tail efficiency variations with Mach number. Elevator effectiveness can be determined using tails with preset elevator angles.

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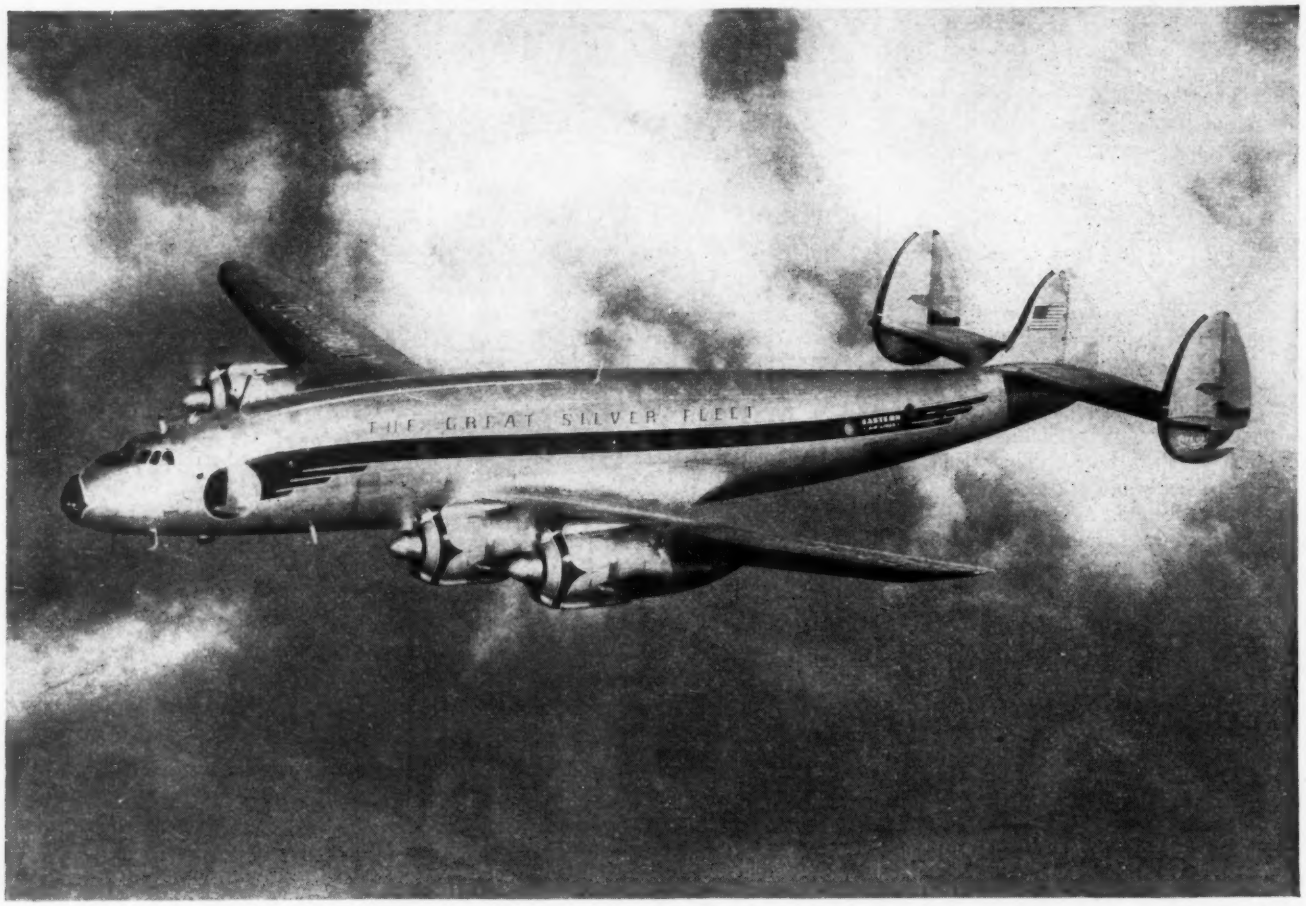

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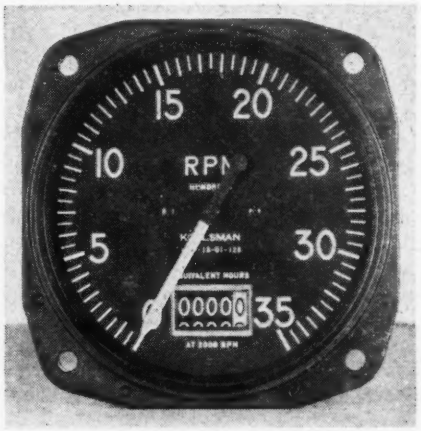
NEW AVIATION PRODUCTS

Combined Tach and Hour Recorder

Need for keeping an engine log is stated to be eliminated with use of Tacholog, new combination tachometer and engine-hour recorder being produced by **Kollsman Instrument Div. of Square D. Co.**, 80-08 45th Ave., Elmhurst, N. Y. This instrument pro-



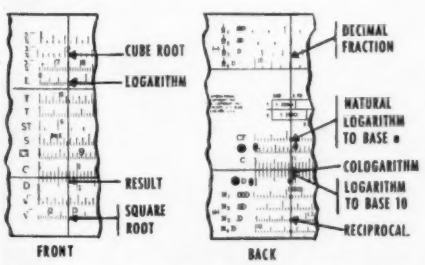
vides cumulative indication of engine hours based on average cruising at 2,000 rpm., and company reports it gives accurate indication of engine wear because engine hours are counted slower at idling speeds and more rapidly at higher speeds. Light in weight, this combination unit fits AN Standard 3⅛-in. mounting hole, and connection on instrument is standard SAE ⅞-18 T/I screw type.

Tiny Radio Capacitors Save Space

Miniature capacitors, molded in flat, mica-filled phenolic cases for space economy, are offered by **Tobe Deutschmann Corp.**, Canton, Mass., as particularly suitable for use in airborne radio apparatus. With working voltage of 75-v. d.c., dimensions of available types are: .001, 005 Mfd., $\frac{5}{16}$ in. by $\frac{5}{16}$ in. by $\frac{3}{32}$ in.; and .05 Mfd. $\frac{11}{16}$ in. by $\frac{23}{64}$ in. by $\frac{3}{32}$ in. Units are case-sealed against 80% relative humidity.

New Multi-reading Slide Rule

Computations are reported simplified with new deci. log log slide rule announced by **Pickett & Eckel**, 5 S. Wabash Ave., Chi-



cago 3. Scales on front of rule are arranged so only one setting of hairline gives square root, cube root, and logarithm with each result. Log log scale on back gives five readings with each hairline setting: (1) Decimal fraction to 4 and 5 figures, (2) reciprocal to 4 and 5 figures, (3) logarithm, (4) cologarithm, and (5) natural logarithm to base. Scales read from one ten billionth to ten billion and give decimal point location. Simple legend tells which scale to read when raising to powers. Rule comes with case, instruction manual, and set of typical problems.

Keeps Rubber "Alive"

Rub-R-Vive is new plasticizer-cleanser fluid for restoring original qualities of rubber. Applied either by cloth or brush, liquid is seen specifically suitable for maintaining condition of pneumatic equipment, rubber gaskets, and varied types of rubber tubing. Being relatively non-volatile, it is stated to have a more lasting effect than former treatments. Maker is **Schwartz Chemical Co.**, 326 W. 70 St., New York City 23.

Compact Intercom Fits in Pocket

Small size and light weight are features of Speak-EZ intercom specifically brought out for use in lightplanes for two-way conversation between flight instructor and student, or pilot and passenger. With all connections

at one end, device may readily be carried in pocket while in use. Unit accommodates two standard single-button mikes with press-to-talk switches, and two high-impedance headsets. Power is supplied by hearing-aid type batteries. **Airlectron Co.**, 435 Bloomfield Ave., Caldwell, N. J., is the manufacturer.

Airliner Cradle for Infant Traveler

First class accommodation for the baby who journeys by airline is provided with new flight cradle offered by **Global Aircraft Specialists**, 40-22 Lawrence St., Flushing, N. Y. Featuring special adjustable support arm, flying crib is easily set up by hostess, and when not in use only a small space (3 in. by 16 in. by 35 in.) is required to store it. Maker describes cradle as roomy and comfortable for the tot traveler, yet it weighs but 4 lb. complete with case.

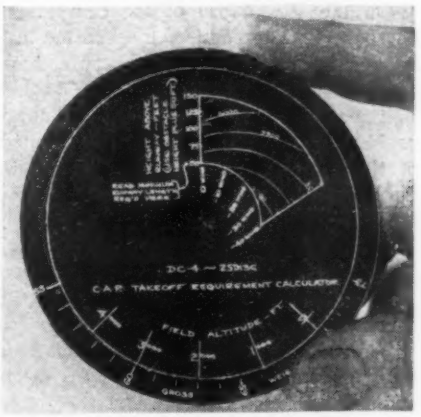
Precise Pressure Transmitter

New pressure transmitter for use in aviation field with air, oxygen, oil, gasoline, hydraulic fluids, and the like, is offered by **Autoflight Instruments Div. of G. M. Giannini & Co.**, 285 W. Colorado St., Pasadena 1, Cal. Reported to give high accuracy

(within 2%) with a large a.c. or d.c. signal, Series 4600 model combines controlled action bellows (or bourdon tubes) and microtorque potentiometers into single unit. Transmitters can be supplied with resistances from 100 to 20,000 ohms and ranges of 0 to 500 psi., with special ranges on application. Specifications: Overall length, under 6 in.; maximum width, 3 in.; and approximate weight, 1.3 lb.

Computes Safe Takeoff Weight

Pocket-size calculator to enable pilots to make quick determination of allowable takeoff and landing weights of their transports is announced by **Luttrell & Senior, Inc.**, aviation consultant firm. Of special interest because of particular attention now given to ratio of gross weight to runway length, device takes into account field altitude, wind, and obstacle height and distance, as well as this runway dimension. Computer consists of small partial disk superimposed on a mas-



ter disk. After pilot sets calculator for runway length and wind, one side gives him reading of safe takeoff weight, while other side indicates safe landing weight.

Flying Farmers View Planes With Eye to Rural Utility

Convention hears Stinson promise of new lightplane; tours several Oklahoma ranches; elects new officers.

More than 700 delegates in 362 planes flew into Stillwater, Okla., for the second annual convention of the Flying Farmers Association to see the first demonstration of a new plane especially suited to their needs, and to hear promise of another lightplane which may be tailored to their uses.

While most manufacturers and distributors had their latest personal plane models on display, particular attention centered on the four-place Luscombe Silvair Sedan (AVIATION WEEK, Aug. 11).

▶ **New Stinson Model**—W. H. Klenke, Jr., general sales manager for Stinson, which had on display a Flying Station Wagon, announced during the convention that Stinson would have a new model ready for production some time this autumn. He declined to say what it would be like, the price bracket, or whether it is designed particularly for use of farmers.

He said his company is increasing the production of the Station Wagon to 90 percent of its total Stinson production on Sept. 1. During the first six months of 1947, Stinson produced 13 planes a day and since then has been producing 8 planes a day, which it plans to continue.

▶ **Others on Display**—Other planes displayed included the Cessna 195, the Rowden secondary trainer and duster, the postwar model two-place Funk, the Beech Bonanza, the Stinson Flying Station Wagon, Fairchilds, with the Warner and Ranger engines, and Cubs and Aeroncas.

On the second day of the convention, the farmers, who consider the airplane just another useful tool around the farm, took an aerial tour of several of the large ranches in the southern part of Oklahoma, known as Hereford Heaven. The planes, touted as the "largest peacetime flight of private airplanes" in the history of the country, landed at the Turner ranch, owned by Oklahoma's Governor Roy Turner, for a barbecue luncheon before returning to Stillwater.

Actual count showed 343 planes on the ranch landing strip.

▶ **Farm Uses Demonstrated**—The rural fliers spent most of the two and a half day meeting at serious convention business or watching demonstrations of planes for farm use.

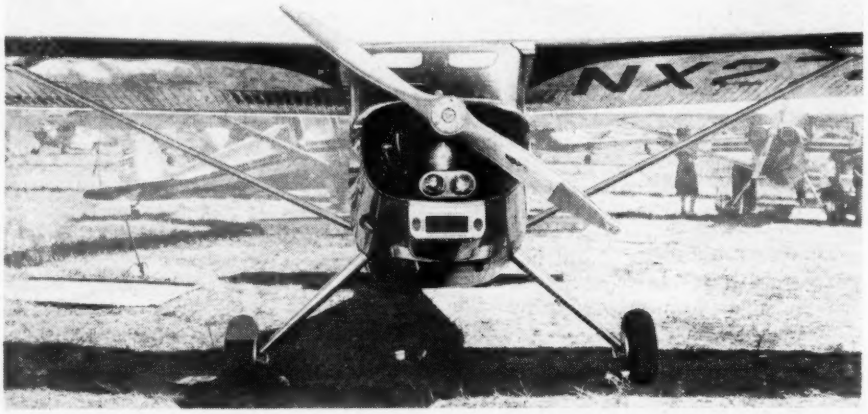
Crop dusting and spraying demonstrations were staged the first and last days.

At the convention business sessions the farmers sought to set up an economical airplane insurance plan and inaugurate a Flying Farmers magazine. They finally decided to join in the AOPA insurance plan and put out their own magazine.

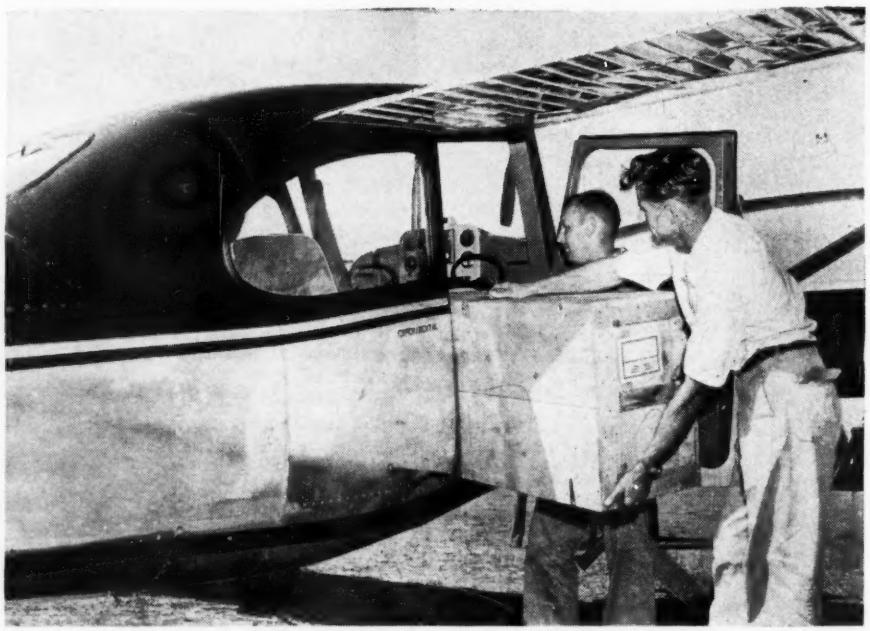
Forrest Watson, Thomas, Okla., wheat farmer, was re-elected president of the national organization. Other new officers include Alfred Ward, Johnson, Kan., vice president; Bert Hanson, Vernon Center, Minn., secretary-treasurer.

Oertel SPA President

Robb C. Oertel, Montclair, N. J., Esso aviation sales manager, was elected president of the Sportsman Pilots Association at its recent meeting held at Gray Rocks Inn, St. Jovite, Quebec. Other officers elected are: Harrison Somerville, Washington, first vice president; Harold Wood, Birmingham, second vice president; C. W. Warrington, Chicago, secretary-treasurer, and John A. Shartle, Troy, Ohio, assistant secretary-treasurer.



Front view of new Luscombe shows good visibility for ground handling, and clean lines of landing gear.



W. H. Swatsley (left), foreman of Luscombe experimental department, show size of cargo packages that can be loaded in new four-place craft. This box goes in simply by removing right front seat.

AIR FRAME PARTS that "Stay Put!"

Stability under a wide range of conditions is a vital matter in the control parts of an airplane, and it is because Formica has that quality in an unusual degree that it has so generally been used for pulleys, fairlead bushings and machined parts.

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See 100-Hr. a Month Helicopter Utilization

California firm shows 5-mo. profit keeping craft busy average of 80 hr. per mo. on contract basis.

Indication that today's commercial helicopters may be expected to produce a utilization of up to 100 hr. monthly on a contract basis is given on the West Coast by Armstrong-Flint Helicopter Co.

Knute Flint, associated in the ownership of two Bell 47-Bs, compares with fixed wing contract time the 80 hr. per month flown by each of his company's helicopters during the past month.

He told AVIATION WEEK that in 5 mo. of operation his company consistently has shown a profit, and added:

"A strong factor in profit-showing has been to avoid the inclination to 'show off'. We have kept non-income flying to the lowest possible percentage of our total time, and have done absolutely no tie-in publicity stunts. The only demonstrating work we have been doing has been for power line companies, municipal and Federal authorities, and prospective students."

Approach of its first half-year of operation shows the western company to have logged 450 flight hr. in performance of a wide variety of contracts ranging from advertising "spectaculars" to power line patrol and forest service emergency flights.

▶ **Inspection Time Cut**—Greatest expense item during this period has been 100-hr. inspections, the first of which consumed 200 hr. and cost $1,700. The company's subsequent inspections were reduced to 4 days and 5 nights. This is qualified by the fact that at each inspection the helicopter has been completely disassembled (with exception of the engine) and rebuilt. The time will be reduced materially as inspection and replacement times are developed for component parts.

During flight operation the company employs one mechanic per ship, increasing this to one and a half men per ship during inspection periods.

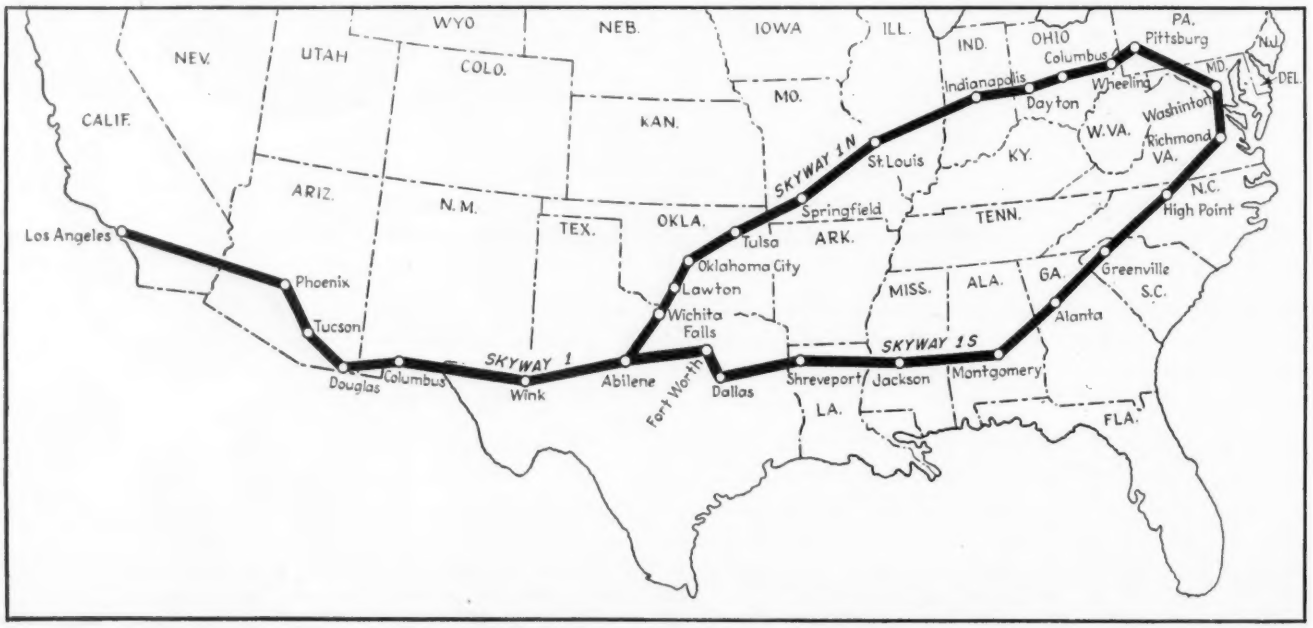
In a field that still is almost wholly devoid of competition, the A. F. company has been able to negotiate service charges designed to cover admittedly high costs of business "pioneering" and still return a profit.

Flint reports his company's charges range from $50 per hr. to as high as $1,600 per hr. The low charge is for bulk time, such as power line patrol, forest service flights and student training. Power line and forest service contracts include a charge of $22.50 per hr. for stand-by time. The maximum charge made so far was $850 for slightly more than 30 min. of flight.

Prime evidence of the ever-widening market for helicopter contract service was shown recently when an A.F. helicopter was employed by Rocky Mountain Steel Corp. at Los Angeles to lift three large crosses (see photo) 150 ft. up a sheer mountain slope at the side of the Pilgrimage Play.

In this instance, the contracting steel company discovered that a wood stairway to the ledge upon which the crosses were to be placed had become unsafe, and that repair costs would exceed the cost of contracting for a helicopter to do the lifting job. Individually the crosses were lifted at the end of a 10-ft. cable slung from the helicopter and hovered into position with the helicopter rotor clearing by only 2 ft. the heavy brush on the mountain wall. On one flight the pilot was forced to clip brush tops with his rotor in positioning a cross; which was accomplished without damage.

Bell helicopter of Armstrong-Flint Helicopter Co., Los Angeles, positions one of three heavy crosses lifted 150 ft. up steep mountainside in operation proving less expensive and time-consuming than would have been taken by conventional transport means.



SKYWAY FOR TOURING AIRMEN

Route for the new Skyway No. 1 designated by CAA Administrator T. P. Wright as an aerial main highway for tourist traffic between Los Angeles and Washington. It will be airmarked by towns and communities in an area 20 miles on either side of the route line.

Service of Supply

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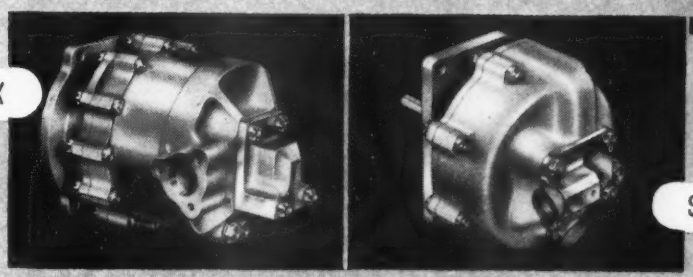

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FOR BETTER PLANE SERVICE

Installation of four new utility pits on the ramp of the Atlantic Aviation Corp. hangar at Teterboro, N. J., makes possible far more efficient cleaning and servicing of customers planes. Each pit, when covered is flush with the ramp. Outlets for compressed air hose, electricity and water are contained in each pit, so that service employes can vacuum plane interiors, check tires and wash planes, on the ramp, without hauling long hose lines and electric lines from the shop. Photo shows four-place Beech Bonanza getting "the works" with other planes in background. Sidney Nesbitt, head of Atlantic Aviation, is northeastern distributor for Beech.

Powell Named President Of National Flight System

Movie actor Dick Powell has become president of National Flight System, newly organized "mass production" flight training sales organization (Aviation Week, July 14).

Under the NFS plan, student sales, advertising and promotional work will be done by the organization, with actual instruction being done by local operators working under a NFS franchise. The "packaged" course includes eight hours' flight instruction; 26 lessons in navigation, meteorology, theory of flight, engines, and maintenance; club rates for post-solo aircraft rental; discounts on plane purchase, and offering of home study courses and employment services.

On assuming the presidency, Powell said "it should be stressed that National Flight System does not compete with existing facilities. Rather, we create new customers for aviation. All flying instruction under the NFS plan is done by qualified local instructors, appointed by us in consultation with the local NFS distributor.

"Our distributors are concerned solely with the sales and service of the NFS plan; this frees them from the necessity of maintaining flight equipment as well. As far as we know, ours is the first such approach to the mass distribution of personal flying."

NASAO Convention To Fort Worth

National Association of State Aviation Officials annual convention will be held in Ft. Worth, Texas, Oct. 26-28, L. L. Schroeder, president, has announced.

At the same time he reported the nominating committee, to select a slate for 1948, consists of Dexter C. Martin, Director of Aeronautics in South Carolina, chairman; Willard Fletcher, Aviation Director in Rhode Island; Eugene Fryhoff of Missouri; A. W. Hays of Oklahoma; Joseph Bergin of Utah; and Chester Moulton of Idaho.

BRIEFING FOR DEALERS AND DISTRIBUTORS

OREGON FEE BATTLE—Oregon, one of the historically "free" states, aeronautically speaking, and the last to close down on "backyard" airplanes during the thirties, has swung heavily towards the other extreme. In the midst of a court battle over the legality of its $10 per aircraft levy, a new state aviation code has just been effectuated requiring registration of all airplanes and pilots in the states with an annual fee of 2½ cents per pound of payload for the plane and one dollar for the pilot. This new rate scales up the fee from $10 to as high as $90 and is expected to meet with renewed resistance. Funds from the registration fee are earmarked for a search and rescue activity, according to Leo Devaney, Oregon State Director of Aeronautics.

TEXAS AIRPORTS—Texas Aeronautics Commission reports that every town in the state of 7,000 or over has one or more airports, a total of 73 towns qualifying. Among towns of 3,000 to 6,000 population, more than one-half have airports and there are 26 Texas towns of about 1,000 persons that have airports. This interesting evidence of active aviation interest in the state, possibly the highest level of airports-per-town in the nation, is explained at least partly by the geography of the area and the scattered nature of the towns, making aircraft a more practical convenience than in most other states. The Aeronautics Commission believes that the prime need of the state is more emergency fields along the routes of air travel, a program requiring finance by the state without CAA aid, which only extends to communities providing matching funds. Texas' airport lead continues to grow with 592 airports on record as compared to 360 in California, second ranking state.

ACTIVE MARKET—A growing market for personal aircraft is shaping up among state aviation and police commissions as these agencies expand their aerial policing and inspection activities. Minnesota has just added a four-place Fairchild 24 and a two-place Luscombe Silvaire and the Pennsylvania Aeronautics Commission is now operating a twin-engine Cessna, a Stinson Reliant and two Piper Cub Cruisers.

PILOT'S NIGHTMARE—If you have ever wondered what would happen if you broke every rule in the book, the answer is now available: it would cost you $37,000 and a lien on your airplane in favor of the U. S. Government provided you did as thorough a job as three Kansas fliers. Fritz Womack and Russell Yarton, both of Iola, Kas., and Jordan Puidk, of Humboldt, Kas., have been charged by the CAA with not having nor having had medical certificates or pilot certificates and flying aircraft without airworthiness certificates, periodic inspections, registration certificates or airplane identification markings. The CAA has filed suit for $1,000 for each of 37 counts against the trio and attachment of liens on the three airplanes.

SKY COP SCHOOL—Officers of the Washington State Patrol recently were given instructions in how to guard the skyways as well as the highways in a state aviation law enforcement school held at Fort Lawis, Wash., under the sponsorship of the State Aeronautics Commission and the CAA. After lectures on the need for enforcement of careless and low-flying provisions of the various statutes, instructors and patrolmen went to the Fort Lewis airport and witnessed graphic examples of what to watch out for demonstrated by CAA pilot Wilson Gillis. Need for such instruction was demonstrated when Gillis made five "passes" over the field at different altitudes and the ensuing estimates by the students missed the mark by several thousand feet.

GI HELICOPTER SCHOOL—New England Helicopter Service, Inc. has been authorized to conduct the first helicopter training school with the benefits of the G.I. Bill of Rights. Pilot Training and a special Helicopter Instructor's Course are now available for veterans. The company is also awaiting approval of its Helicopter Mechanics Course for G.I.'s.

MEXICAN NAVIONS—Howard F. Klein, North American Navion distributor for Mexico and six Central American countries, tells Ryan officials that the four-placer is receiving wide acceptance below the border, particularly in the Mexico City area, located at 7,500 ft. He points out that the Navion's higher power pays big dividends in the region, where planes cruise at about 12,500 ft. on normal local hops. Klein's seven salesmen use Navion's on business trips and three Mexican State Governor's have bought them. Klein plans a monthly trip to San Diego (sea level) to pick up new planes and confer with Ryan sales and service executives.

TWO FOR FOUR-PLACE—Sample of a general trend that gives the four-place personal plane manufacturers some trade-in problems just now is the report that Gov. Kim Sigler, of Michigan, who last year bought a Cessna 140 two-place personal plane, and flew it around the state quite a lot, now has taken delivery on a four-place Beech Bonanza. It was pointed out that the new plane like the Cessna, and like most other personal planes nowadays, was powered by a Michigan-built Continental.

ALEXANDER McSURELY

British Report Progress On Transport Production

Vickers Viceroy slated for early '48 test flight; status of other types revealed by Ministry of Supply.

(McGraw-Hill World News)

LONDON—One more new British civil transport plane, the Vickers Viceroy, has been added to the list of postwar designs which are scheduled for near-future operation. The Viceroy, a medium-range craft built to Brabason IIB specification, was revealed as due for an early-1948 first flight at a recent Ministry of Supply conference. At the same time, the Ministry gave a "progress report" on other British civil aircraft now under development.

The Viceroy, which will be slightly larger than the Vickers Viking, will be powered by four turboprops (either Rolls-Royce Darts or Armstrong-Siddley Mambas). It is being built to replace the Viking on European routes. Two prototypes have been ordered by the Ministry of Supply. British European Airways is the specific operator at which the Viceroy is aimed, but so far no quantity order for this design for BEA's use has been placed.

The 130-ton Bristol Brabazon I will be ready for transfer to its specially-built assembly hangar at Filton, Bristol, in late September or early October. Four are being built, one with Centaurus piston engines, and three with Proteus turboprops.

The Saunders-Roe SR. 45 flying boat, which is of about the same weight and size, is expected to be ready to fly in the spring of 1950. Three have been ordered.

The DH 106 transatlantic air liner, perhaps the most advanced type of all, is also expected to make its first flight early in 1950. It will be powered by four de Havilland Ghost turbojets.

▶ **Ambassador Flight Test**—The Airspeed Ambassador should be ready to start its flight trials late this month or early August. Only prototypes have been ordered so far. As the question of a production order will not be considered until the craft has flown, a delay of at least 18 mo. is inevitable.

In addition to three prototypes, 50 Miles Marathon airliners have been ordered, 30 for British European Airways and 20 for sale by BOAC to associated companies. The Marathon prototype, fitted with turboprops, may make its first flight at the end of this year.

▶ **Other Craft Ordered**—The Ministry of Supply has ordered 12 Short Solent flying boats which are civil versions of the military Seaford. Although no order has been given for the private venture Percival Merganser, production has been sponsored by the Ministry. Only two Cunliffe-Owen Concordia aircraft have so far been ordered for BEA.

Of the Bristol Type 170, two prototypes and 23 production models have been ordered, eight Wayfarers (passenger versions) and six Freighters (cargo versions) for BEA, six Wayfarers for British South American Airways, and three others which have not yet been allocated.

Various types of Avro Tudors are being developed and undergoing flight trials. The improvements effected will be incorporated in one type of Tudor which will go to Boscombe Down for official trials. One version, the Tudor VIII, which will be powered by four Rolls-Royce Nene turbojets, is expected to make its first flight in the fall.

Vickers Renames Viceroy

LONDON—Vickers-Armstrong, taking note of change in political status of India and the British Raj, has renamed the "Viceroy," its four engine (turboprop) transport, the "Viscount." The aircraft, whose development is sponsored by the British Ministry of Supply, is intended to fulfill the Brabazon IIB specifications and ultimately replace the "Viking." Selection of engines will depend largely on those the builder can supply.

Reports that Vickers-Armstrong have completed a design for a six-jet transport that should be flying by 1951 (AVIATION WEEK, Aug. 4) are too optimistic. Such a project is under consideration, but further progress must be based on development work being done on the "Viscount."

SHORT SHETLAND NEARS COMPLETION

Scheduled for launching this month is Short-Saro Shetland, Britain's biggest flying boat. It replaces prototype destroyed by fire just before flight tests. Originally designed as long range patrol bomber, passenger version would accommodate 70 passengers and crew of 11. Powered by four 2,500-hp. Bristol Centarus engines, design high speed is 267 mph. Span is 150 ft., length, 110 ft. and gross wt. is 130,000 lb. Interior view (right) shows spacious flight deck which features bubble-type canopy.

FINANCIAL

Bankers Must Share Criticism Directed at Airline Management

Wall St. inspires derogatory publicity on ability of some industry officials but financial advisers are responsible for mistakes which retard company readjustment.

It has become a popular sport of late to use the airline industry's present difficulties as a backdrop for attacks leveled against managements. Much of this criticism emanates from financial sources and was detailed in a recent article in the *New York Herald-Tribune*. This is understandable as the decline in the market prices of airline securities has entailed substantial losses and endangered the position of many airline investments.

It is true that there is much room for improvement in various airline managements. This is a condition found in any industry and not confined to any one group. It is the disparities in managerial judgment which generally account for varying degrees of success or failure. Moreover, with the benefit of hindsight, outside strategists can afford to venture retrospect judgment on the course that should have been followed by the airlines.

▶ **Little Constructive Criticism**—Nevertheless, very little of this recent criticism assumes a constructive approach or is it founded on a sound understanding of airline economics. The *Herald-Tribune* article reported banker dissatisfaction with airline management's failure to come up with a dependable cost allocation formula for its various services. This appears to be a valid enough complaint but somewhat removed at present from reality. The railroads, with their extensive background of operating experiences and the Interstate Commerce Commission in passing upon many rate proceedings, have yet to evolve a satisfactory formula for allocating proper costs to the passenger and freight services. The ICC system of allocating expenses on a pro-rata basis is recognized as unsound and inhibitory but continues in effect. The CAB and a number of airlines have had a far more complex problem in determining a proper cost allocation formula and have done considerable work in this field with the expectation of developing the proper solution to this problem long before the railroads.

All of the airline industry's errors have not been committed by management. Financial institutions have made a few serious ones which have not helped the credit standing of the industry.

▶ **TWA Loan Cited**—The outstanding example, of course, is the $40 million in loans extended by the Equitable Life Assurance Society of the United States to TWA. This institution with its $4.2 billion in assets is not sacrosanct nor are its actions beyond review. This insurance company with its long experience in making investments and its staff of experts showed a remarkable lack of understanding of the simple facts of life concerning airline operations and trends.

In loaning TWA first $30 million and later an additional $10 million, the Equitable did not insist upon additional equity capital being brought into the airline. The loans were intended to finance the purchase of the Constellations and were assumed to be self-liquidating through depreciation charges on such equipment.

Past experience has adequately demonstrated that the inauguration of new routes is patently expensive and requires considerable time before achieving profitable results. It must have been apparent that in a highly leveraged situation such as TWA a few adverse developments would wreak havoc with the company's finances. Unfortunately, through forces beyond its control—the grounding of the Constellation and the pilot's strike—TWA ran into rough financial weather. At that point, the company found it impossible to obtain additional funds except from its principal stockholder.

However, it would have been a far simpler matter if the Equitable had conditioned its loans upon more equity funds being brought into the company at the same time. At that stage, the credit rating of TWA was much better and it would not have been difficult to have arranged some form of equity financing. The Equitable, however, appeared eager to advance the money to TWA and traditional precautionary instincts appeared to be ignored.

▶ **American Airlines Financing**—On the other hand, American Airlines in its financing more than a year ago used a combination of bond and equity financing. A total of $40 million in debentures and a like amount in convertible preferred were sold through investment bankers. This assured the introduction of equity capital as a cushion to the bonds. It is interesting to note that the Equitable also bought $20 million of the American debentures, which currently sell at a material discount to the original offering price. It is also noteworthy that the investment bankers in this financing, Kidder, Peabody & Co.; Lehman Bros.; Glore, Forgan & Co., and Emanuel, Deetjen & Co., experience considerable difficulty in selling these new issues and suffered a loss while American received the total proceeds of approximately $80 million.

▶ **Capital's Difficulties**—Capital Airlines' ill-advised past financing has plagued that carrier and compounded its difficulties. In October, 1945, its investment bankers, White, Weld & Co., saddled the airline with a $10 million convertible income debenture issue.

These debentures have all the attributes of a convertible preferred stock and were never seriously regarded as a bond by the investment public. Nevertheless, in designating these securities as debentures certain restrictions were written into the trust indenture which ties the management up in knots as far as future financing is concerned.

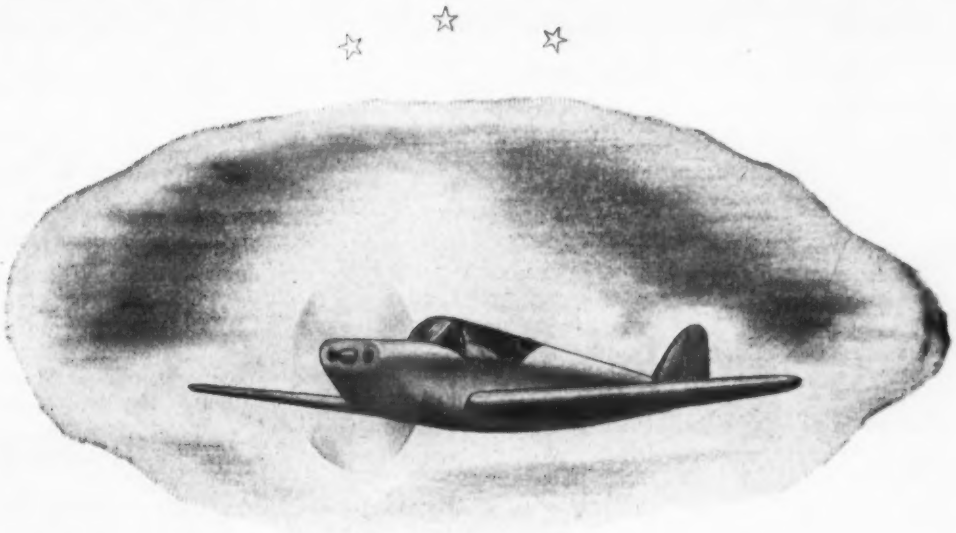
The indentures have no lien on any properties but are merely backed by the company's general credit. Interest is mandatory on the debentures only if earned. The debenture holder certainly has no added security, and for all practical purposes would have been in the same position holding a convertible preferred stock. Had such a convertible equity been sold in Oct. 1945, Capital would have retained the ability to issue senior securities to finance its recent capital requirements. The fact remains that the market a few years ago would have easily absorbed a convertible preferred stock.

▶ **Market Misjudged**—Moreover, the bankers again misjudged the market when they failed to force conversion of the debentures at an opportune time.

It is the existence of these debentures which effectively has prohibited the marketing of any new securities. In view of the straight-jacket in which Capital finds itself, White, Weld & Co. recently attempted to effect a recapitalization of the airline. This abortive attempt failed and was withdrawn. The debenture holders could not accept it. Among other things, the debenture owners were asked to relinquish many of their rights and legally subordinate their claim to the $4 million in bank loans. For its services in effecting this recapitalization, the banking firm was to receive a fee for each bond deposited under the plan. A number of debenture holders were quite vocal in their opposition and could not understand why White, Weld & Co. should be rewarded with a fee for weakening the position of the debentures it had sold and which depreciated more than 50% in price.

There are other examples where bad and inferior judgment on the part of bankers has not always been in the best interests of the air transport industry. The financial community is a necessary and valuable adjunct to the constructive development of the airlines. However, no one category, airline management or bankers have a monopoly of the consummate "know-how" necessary to assure the success of any given company.

—Selig Altschul.



PLANE TALK

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Martin Memo

Published by The Glenn L. Martin Company

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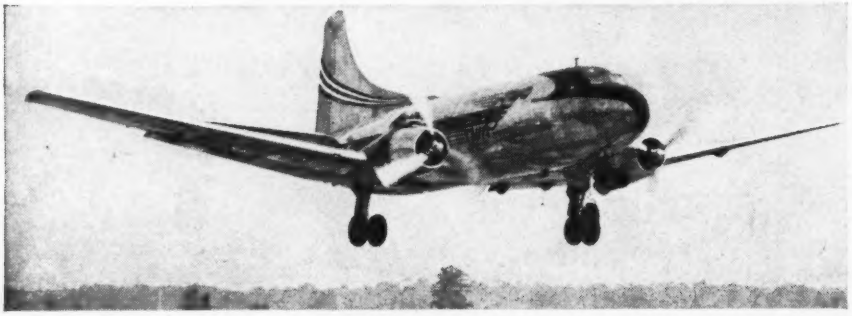
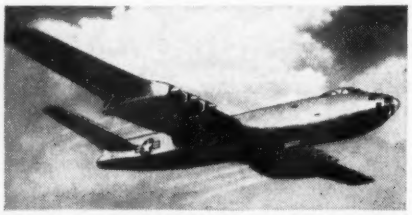


Toughest Test Yet . . . After having flown a distance greater than three times around the world during early flights and on CAA tests, the new Martin 2-0-2 was subjected to a grueling accelerated service test. First of its kind, the test consisted of a series of flights carried out under actual airline operating conditions. It covered a nation-wide network of more than 18,000 miles and included landings at more than 50 different airports. By meeting the varying extremes of altitude, weather and airport facilities encountered, the 2-0-2 offered further proof that it is America's top twin-engine airliner.

Pilot's Third Arm . . . The revolutionary new automatic, propeller-feathering system, developed for use on the Martin 2-0-2 and 3-0-3, permits, for the first time, full take-off weights and maximum operating economy on a twin-engine airliner. Thoroughly tested, this latest Martin development assures top performance during complete or partial engine failure on take-off. The system, in effect, feathers the propeller when the windmilling drag exceeds the thrust and at the same time cuts off the fuel booster pump. Pilots can easily over-ride the automatic system if they desire. Operators will benefit directly, as the use of the automatic feathering system allows greater take-off payloads.

Keep Our Air Arm Strong . . . The American Legion's intensive Air Power educational program is bringing to the American people the knowledge that Air Power is Peace Power and that without air power there can be no security for the nation. In a statement to members of the American Legion, Paul H. Griffith, National Commander, stated in part, "The destiny of the United States and the world today rests on air power. America must be kept first in the air." To keep America first we must continue our advanced aviation research and maintain an aircraft industry capable of rapid expansion in an emergency.

AIR POWER IS PEACE POWER



Look What's Up . . . The new Martin XB-48, latest pride of the Army Air Forces, gets a powerful push from its six jet engines . . . zips along at extremely high speeds . . . is the largest conventional multi-jet plane yet constructed . . . pioneers a new bicycle-type landing gear developed by Martin for our AAF. After its first flight on June 22, the XB-48 made its next three flights during the following week. An exceptional record for most newly designed planes, but not for a Martin plane. For example—the Martin 2-0-2, which made its second flight 15 hours after its first, had a record of nearly 100% availability during the rigorous testing period.

Zip, and They're Up . . . Thousand one, thousand two, thousand three, thousand four . . . it takes four seconds to read that aloud and that's all the time it takes for the landing gear of the Martin 2-0-2 to retract. Exact figure is 3.9 seconds. This quick reduction of drag at take-off is an added safety factor, and enables the 2-0-2 to reach its high cruising speed faster.

Faster, Express-Speed Schedules . . . on short-haul runs are possible with the Martin 2-0-2. This speedy airliner cruises 100 m.p.h. faster than the planes it supplants. This extra speed enables operators to cut schedule time by ⅓—build passenger acceptance—get more trips between inspections. In short, the new 2-0-2 cuts costs, builds profits for airlines.

Slip 'Em In . . . No tear-down is necessary to inspect or replace the Martin 2-0-2's Mareng fuel cells. Easily installed or removed through especially designed hatches (above), these flexible cells provide safe, dependable storage for the 1030 gallons of gasoline carried by the 2-0-2. And being flexible, the two tanks (each consisting of four inter-connecting Mareng cells) are less likely to rupture when subjected to continuous vibration or excessive stresses and strains. Intricate corner assemblies, excessive riveting and troublesome metalwork are eliminated.

New Wings for the World's Airways . . . Modern Martin 2-0-2 luxury liners offer new standards in speed, comfort and dependability . . . carry 36 to 40 passengers at speeds 100 m.p.h. faster than the planes they supplant. Air travelers and shippers will gain more time than ever before when they fly and ship in Martin transports on leading airlines. First deliveries on the new Martin 2-0-2 are to Northwest Airlines, with deliveries to follow to other North and South American airlines.

Martin AIRCRAFT

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Traffic Below Expectations During First Half of 1947

Domestic airlines' revenue passenger mileage 10 percent above same 1946 period, but June slump breaks long string of monthly gains.

By CHARLES ADAMS

The domestic trunklines' passenger traffic curve has headed downward after rising steadily for exactly four years, thus eliminating the last possibility that 1947 business will attain the 25 to 55 percent gains over 1946 predicted by industry optimists eight months ago.

For 48 consecutive months until June of this year, the certificated domestic carriers had improved their passenger-carrying record over the corresponding month of the previous year. The unprecedented string of monthly gains began with June, 1943's comparison with June, 1942. It ended when traffic slumped after three highly-publicized DC-4 accidents occurred in a 16-day period between May 29 and June 13 of this year.

▶ **Traffic Up 10 Percent**—Revenue passenger miles flown by the 16 domestic trunklines increased from 2,588,153,000 in the first half of 1946 to 2,847,234,000 during the first six months of this year—a gain of 10 percent. But in June alone there was a decline of 5 percent from last year.

When gains in January and February had held around 15 percent over the same period last year, the industry attributed the relatively poor showing to year-end accidents and worse than normal weather. March gains reached 21 percent over the same 1946 month, but April's increase was only 13 percent and May's 9 percent, with the June loss following.

▶ **Four Increases Shown**—During June, 538,754,000 revenue passenger miles were flown against 564,643,000 in the same 1946 month. Only four of the 16 domestic trunklines showed increases in June, 1947, over June, 1946—American, Inland, Mid-Continent and United.

Load factors were off sharply. Among the big four, American's load factor was 74 percent in June, 1947, against 86 percent in June, 1946; Eastern was down from 80 percent to 58 percent; TWA from 86 percent to 70 percent and United from 86 percent to 82 percent.

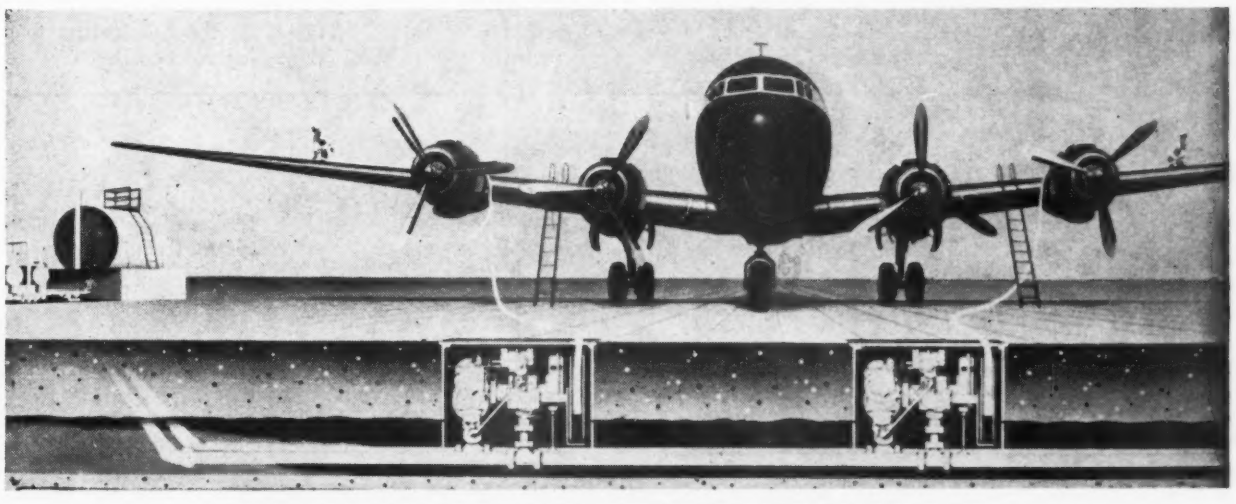
▶ **Smaller Carriers Affected**—The June traffic drop was even more noticeable among some of the smaller carriers. National's load factor skidded from 80 percent in June, 1946, to 45 percent in June, 1947, as its revenue passenger mileage fell from 17,254,000 to 11,452,000. Northeast's load factor plummeted from 69 percent to 44 percent and its revenue passenger mileage from 9,168,000 to 5,508,000 in the same months.

Barring another series of accidents, passenger traffic is still expected to reach new all-time peaks in 1947. But the increase over 1946, the previous record year, will be modest—certainly no more than 20 percent and probably considerably less.

▶ **Average Trip 500 Miles**—The 16 domestic trunklines flew about 5,911,000,000 revenue passenger miles in 1946 and carried around 11,931,000 revenue passengers. Approximately 5,712,000 revenue passengers were flown in the first half of 1947.

Mail ton miles flown by domestic operators during the first half of 1947 totaled about 16,307,000 ton miles, down 8 percent from the 17,788,000 ton miles flown in the same 1946 period. But freight ton miles flown more than tripled, soaring from around 4,000,000 in the first half of 1946 to about 12,350,000 in the first six months of 1947. Express rose more than 46 percent from about 9,400,000 ton miles to 13,761,000 ton miles.

The seven feeders active in the first half of 1947 operated 15,708,000 revenue passenger miles, considerably less than 1 percent of the total flown by the 16 trunklines. Feeders carried 81,019 passengers, or slightly more than 1 percent of the number flown by the long-haul operators.



SAN FRANCISCO STREAMLINES TRANSPORT FUELING

Faster and safer servicing of transport planes at San Francisco Municipal Airport has been made possible by this tailor-made fueling system developed by United Air Lines, Standard Oil Co. of Calif. and Wayne Pump Co. DC-6 with fuel capacity of 4,200 gal. can be gassed in 10½ min. Artist's sketch of system, which is now in operation, shows how use of fueling pits eliminates need for conventional tank trucks. Pit outlets are connected by underground pipelines to 13,000-gal. above-ground tank which is automatically maintained at 9,000-gal. level by Standard's 1,000,000 gal. airport tank farm.

White Takes NEA Engineering Post

Appointment of Robert B. White as director of engineering and maintenance for Northeast Airlines and designation of Robert H. Biron as vice president in charge of industrial relations for TWA were announced recently.

White

White has had 25 years' management experience in the aviation and petroleum industries. During the war he was chief of aircraft maintenance and engineering in the Air Transport Command's India-China Division.

Biron, who has been vice president in charge of industrial relations for Northrop Aircraft since March, 1945, will succeed Matthew M. Gouger, who resigned from TWA effective Sept. 1.

Other personnel developments:

- **Northwest**—James W. Mariner, formerly manager of cargo traffic for TWA's International Division, has been named to the newly-created position of director-cargo rates and procedures.
- **Pacific Overseas**—Paul C. Ochsner has become traffic representative in Portland, Ore., Ted Harris in San Francisco, Elmer Basey in Los Angeles and J. P. Shaughnessy in Guam.

CAB ACTION

The Civil Aeronautics Board:

- Ordered investigation of latest universal air travel plan agreement and universal air travel plan tariff No. 3 (Docket 3079).
- Ordered investigation into tariff rules filed by American Airlines, Linea Aeropostal Venezolana, Chicago & Southern Airlines, Colonial Airlines and Waterman Airlines providing for free or reduced-rate transportation for group travel, tour conductors, travel agents and employes, officials and directors of other carriers (Docket 3085).
- Ordered investigation into Colonial Airlines' tariff providing for transportation without additional charge of one pair of skis in addition to 40 lb. free baggage allowance (Docket 3078).

Hawaiian Case

Applications for a new air route between the Pacific Northwest and Hawaii will be denied if CAB follows recommendations made this month by its examiner in the case. Matson Navigation Co., Northwest Airlines, Pan American Airways and Transocean Airlines have requested certification for the service.

As an alternative, examiner Warren E. Baker has urged that the board institute a new proceeding to determine whether United Air Lines' route structure should be modified to permit the carrier to operate nonstop from the Pacific Northwest to Hawaii, by-passing its route junction point at San Francisco. UAL currently operates from Portland and Seattle to San Francisco and from San Francisco to Honolulu.

Resort Airlines Given Special CAB Exemption

Resort Airlines, Pinehurst, N. C., the nation's pioneer operator of all-expense "packaged" air tours, has been granted a special exemption by CAB permitting it to conduct the remainder of its domestic summer program as planned (AVIATION WEEK, Aug. 4).

The board's action indicates it has an open mind concerning this relatively new development in air transportation and brightens prospects that one or more nonscheduled carriers may eventually be certificated for the specialized operation. Resort had told CAB that it might have to suspend service entirely if the exemption were not granted since the board's enforcement and litigation section had found that the domestic tours were being conducted with greater frequency than is permitted.

Pan American to Fly Nonstop to London

Pan American Airways expects to inaugurate the first regularly-scheduled nonstop New York-London service on Aug. 29 with four new-type Constellations and plans to offer through sleeper service over the route beginning Sept. 15.

Equipped with increased fuel capacity, PAA's late model Constellations will make the eastbound Atlantic crossing in about 14 hours, stops at Gander, Newfoundland, and Shannon, Eire, being omitted. The planes have been operating on PAA's regular trans-Atlantic run for two months preliminary to introduction of the express-sleeper service. Pan American's Atlantic division will continue to use its 16 standard-type Constellations via Gander and Shannon.

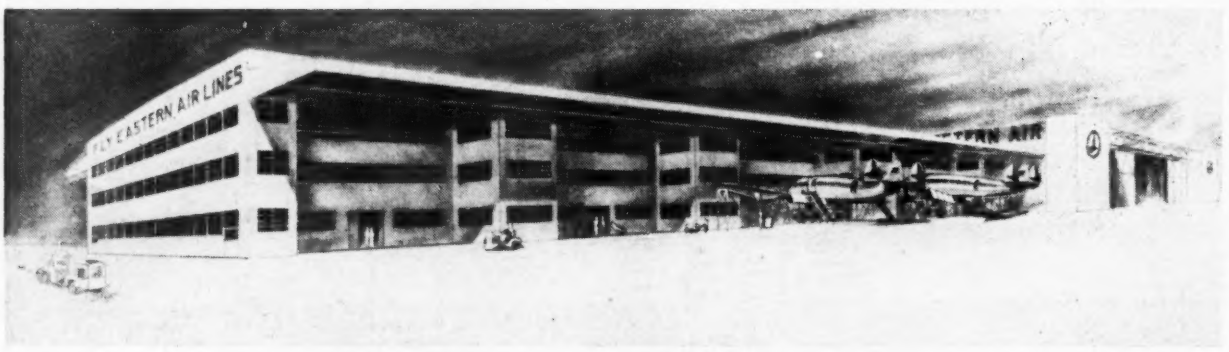
Sleeper accommodations will be available at a charge of $125 above the regular $325 New York-London fare, subject to CAB approval. Air France previously had announced plans to place long-range, sleeper-type Constellations on New York-Paris runs.

Higher Revenues Lift American's Earnings

A sharp increase in operating revenue enabled American Airlines to show a $786,343 net profit in second quarter 1947 and pare its first quarter loss of $3,073,636.

Despite the better second quarter results, AA's net deficit for the first half of 1947 was $2,287,293, compared with a net loss of $121,748 in the same period last year. Second quarter profit in 1946 was only $325,901, but first quarter losses were far smaller than this year.

Operating revenues rose to $22,115,205 in second quarter 1947, up 41 percent over first quarter revenues of $15,703,940. Operating expenses increased only slightly from $18,215,975 in the first quarter to $18,280,742 in the second quarter.



EAL PLANS MILLION DOLLAR HANGAR

Contracts soon will be let on the $1,000,000, three-story maintenance hangar which Eastern Air Lines plans to have completed at its Miami base by next summer. Artist's conception shows the projected new building, which will be 570 ft. long and contain 180,600 sq. ft. of floor space—almost twice the area of the largest structure now on Eastern's Florida base. It will accommodate eight planes at one time, four on each side. Eight dock and cantilevered areas into which planes will be nosed are designed to handle Constellations, DC-4s and DC-3s. At each dock area, a 25-ft. overhanging roof plus a 30-ft. recess will enable the forward 55 ft. of the planes to be under cover while undergoing maintenance.

Engineers for Pioneers

SINCE aviation was an infant, Sensenich engineers have been adding their specialized skills to the development of new aircraft. So it's not surprising to find Sensenich blades on the V-173, a flying model of the Navy's XF5U-1—Chance Vought's flying wing which will have a speed range of 20 to 460 MPH.

You'll find Sensenich propellers on the Fulton Airphibian, the Bell Helicopter and in the wind tunnel at United Aircraft Corp. as well as right on the nose of most of America's personal planes.

There's one reason why: because Sensenich has had more *experience* building wood propellers than any one else in the world! That's why aircraft designers as well as pilots look to Sensenich for propellers which are engineered to get maximum efficiency from all types of aircraft.

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UAL Nets $250,471 During Second Quarter

United Air Lines showed net earnings of $250,471 in the second quarter of this year, but the profit failed to make more than a small dent in the $3,450,671 loss suffered during the first three months of 1947. Earnings in second quarter 1946 were $1,353,601, and the carrier was $841,060 in the black on June 30 of last year.

Based on preliminary indications of July results and a normal seasonal relationship between July, August and September, UAL anticipates that third quarter earnings will show considerable improvement over second quarter results. Passenger revenues in second quarter 1947 were up 24 percent over a year ago, experss revenues gained 63 percent, and freight revenues rose 119 percent. Mail income was down 5 percent.

Passenger load factor in the first half of 1947 was 76 percent against 86 percent in the same 1946 period. Revenue passenger mileage increased from 458,001,616 in the first six months of 1946 to 542,741,575 this year.

Airport Lease Signed

Four major airlines—United, American, Capital (PCA) and Eastern—have signed a 25-year lease for use of the new Akron-Canton, Ohio, airport. The carriers have asked CAB approval to transfer their operations from Akron Municipal Airport.

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SHORTLINES

▶ **American**—Has inaugurated a new service enabling New York banks and other financial institutions to speed up delivery of negotiable bonds to purchasers in Chicago and Los Angeles. The securities are placed in asbestos and fiberglas bags, taken to and from the airport in armored cars and chained to the structure of the plane. Carrier is making daily delivery of the New York Times to Los Angeles by breakfast time on the day of publication.

▶ **Florida Airways**—Has instituted an incentive bonus plan. Monthly passenger quotas are set up for each of the carrier's stations on the basis of previous traffic averages. When these quotas are met or exceeded at a point, each employe at that station will receive a bonus in proportion to the over-the-quota passenger increase.

▶ **Northwest**—Reports a steady decrease in working days lost by employes through on-the-job injuries since 1944. In that year, with an average of 2,544 employees, injuries caused a loss of 1,196 working days; in 1945, with 2,242 employes, 525 working days were lost; and in 1946, with an average of 3,470 employes, working days lost dropped to 425 despite the increase in personnel.

▶ **Pan American**—Will provide ground facilities and services for Australian National Airways at San Francisco Airport, with ANA reciprocating at Sydney, Australia. . . . Revenue passenger miles flown on PAA routes to Alaska and across the Pacific were up 147 percent in June over the same month last year.

▶ **Piedmont Aviation**—Has asked CAB to issue it the certificate which the board authorized April 4, contingent upon a showing of adequate airports. Carrier expects to start DC-3 service around Sept. 15 and states 22 of the 26 cities on its routes now have adequate airport facilities.

▶ **Southwest Airways**—Reports carrying 10,683 revenue passengers on its feeder system during July. Carrier states it handled more passengers during the month than at least two of the nation's trunklines. Southwest is the first feeder to fly more than 10,000 passengers in one month.

▶ **United**—Revenue passenger mileage in July was 15 percent above the same month last year. . . . Company states that 500 of its 1,115 pilots are World War II veterans employed since August, 1945, and another 100 were with the company before the war, took military leave, and have returned to UAL.

▶ **Western**—Has signed an agreement with American Airlines covering joint use of ticket offices in three locations in San Francisco-Oakland (AVIATION WEEK, July 28). A similar agreement covering joint occupancy of four ticket offices in Los Angeles is being worked out. Both carriers will furnish personnel for the offices, and the same employes will sell both airlines' services

Temporary Certificates Favored by House Bill

Mounting Congressional irritation over the slowness of CAB action has been expressed by House passage of legislation directing the Board to dispense with normal procedures and issue temporary certificates under certain conditions. With constituents protesting against the time lag in CAB decisions on new routes, Senate approval of the measure early in the new session of Congress next year appears likely.

The legislation, sponsored by Rep. W. F. Norrell (D., Ark.), directs CAB, upon petition, to grant a temporary certificate for service under consideration pending final decision in the case, provided: 1. That "unusual circumstances affecting the public health, safety or welfare" create an emergency; and 2. That adequate facilities are available for the operation. The temporary certificate would expire 60 days after final disposition of the case and would not "create a presumption" for permanent certification of the service.

• **Totem Air Service,** Seattle, is starting a new run to southeastern Alaska with a PBY-5A flying boat converted for freight and passenger operations.

• **American Air Export & Import Co.,** Miami Springs, Fla., has applied for a CAB certificate to conduct all-expense air tours in the U. S. and to the West Indies, Central and South America. Carrier owns four DC-3S.

• **California Eastern Airways,** Oakland, Cal., has opened offices in the Arcade Bldg., Cleveland, O. Carrier this month inaugurated daily service connecting Cleveland with New York, Detroit, Chicago, Denver, Los Angeles and San Francisco.

Rough Riders

A survey of 11,213 Trans-Australia Airlines passengers has disclosed that only 16 in every 1,000 suffered from airsickness. By groups, one-half of one percent of the male passengers were taken sick, 2.6 percent of the females and 7.3 percent of the children under five years of age.

CAB SCHEDULE

Aug. 26. Hearing on Swiss Air Transport Co.'s request for foreign air carrier permit. (Docket 3068.)

Aug. 28. Prehearing conference on TACA, S. A., applications for foreign air carrier permit extensions and amendments. (Dockets 3016 and 3017.)

Sept. 2. Hearing in Latin American certificate amendment cases of Panagra and Braniff. (Dockets 2527 and 2622.)

Sept. 3. Prehearing conference on Boston-Bermuda service applications by Northeast Airlines, Pan American Airways and Colonial Airlines. (Dockets 1650, 2012 and 3052.)

Sept. 8. Oral argument in Arizona-New Mexico case. (Docket 968 et al.)

Sept. 8. Hearings in Chicago Helicopter Service case. (Docket 2384.)

Sept. 8. Hearing in case involving additional service in California-Nevada area. (Docket 2019 et al.)

Sept. 10. Hearing on CAB's investigation of TWA-Hughes Tool Co. relationships. (Docket 2796.)

Sept. 30. Oral argument in Northeast Airlines mail rate case. (Dockets 1932 and 1890.)

Oct. 7. Hearing involving additional Florida area service. (Docket 1668.)

Oct. 20. Hearing on Pan American Airway's application for route consolidations and extensions in Latin America. (Docket 2811.)

Nov. 15. Hearings on board's investigation of consolidated airfreight tariff agreement. (Docket 2719.)

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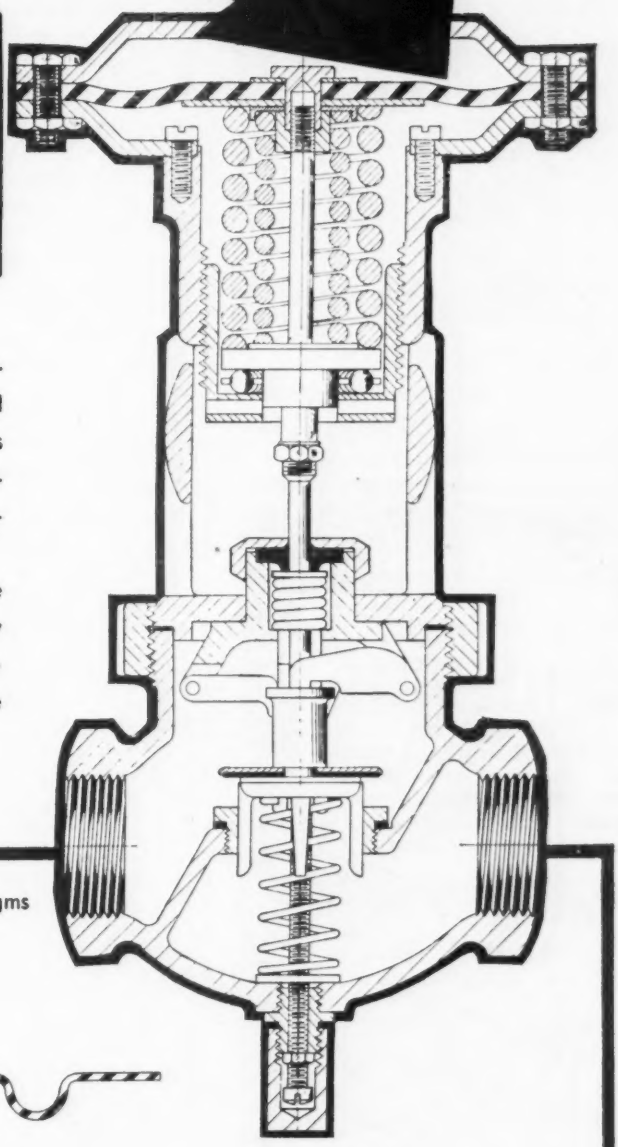

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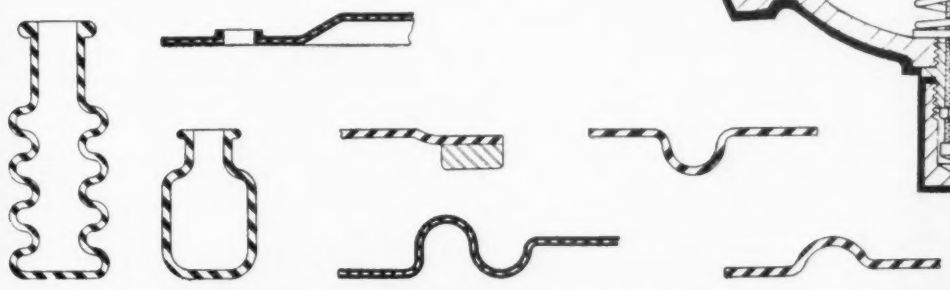

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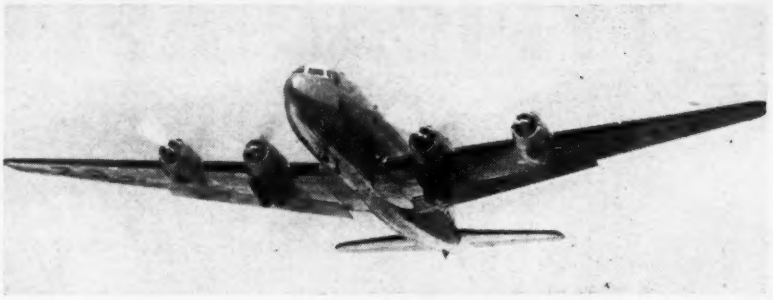

LAST DC-4

Bringing total Douglas Skymasters produced to 1,242 was this final one off Santa Monica production line, shown leaving for London to be delivered to South African Airways. Douglas reports DC-4s in service outnumber all other four engine craft by seven to one, with over 1,000 in use.

New Council Formed By 13 Feederlines

Formation of the Council of Local Service Airlines to supersede the Feeder Airlines Association has been announced by Joseph Garside, chairman of the new group and president of Wiggins Airways.

The development followed a meeting in Washington of representatives of 11 of the 16 regional airlines certificated or designated for certification by CAB and coincided with new requests that the board grant higher mail pay to short-haul carriers.

▶ **Thirteen Members**—With Central Airlines and Iowa Airplane Co. joining the council shortly after the organizational meeting, the group now has 13 members. Others are Challenger Airlines, Empire Airlines, Florida Airways, Monarch Airlines, Parks Air Transport, Piedmont Aviation, Southern Airways, Southwest Airways, Trans-Texas Airways, Wiggins Airways and Wisconsin Central Airlines.

All American Aviation, Pioneer Airlines and West Coast Airlines have not joined the group, which seeks to emphasize the function of its members as regional units, rather than merely funnels to trunk-lines. The council is entirely separate from the Air Transport Association, although nine of the local lines are ATA members. Close cooperation will be maintained between the council and ATA without duplication of activity.

▶ **Asks More Mail Pay**—Meanwhile Challenger Airlines has informed CAB that its current 35 cents a plane mile mail rate and other revenues are not adequate to meet current fixed charges and operating expenses, with the result that its cash position is deteriorating steadily. The carrier stated that a considerably higher mail rate should be established for its initial 90 days' operations.

It asked for 90 cents a plane mile for the three months following inauguration of service May 3; 65 cents a plane mile for the second three months, and 45 cents a plane mile thereafter until a final rate can be set. The company also requested extension of its certificate to July 10, 1950. Challenger's original three-year certificate was dated March 28, 1946.

ANALYSIS OF APPROVED FEEDERS

(Through July, 1947)

Carrier	Route Miles	Points to be Served	Total Pop.	Average Pop.	Points Not Served Before	Average Mileage Between Stops
Trans-Texas**	1,824	28	1,464,312	52,297	20	65.1
Piedmont*	1,775	24	2,084,472	86,853	7	63.4
Parks*	1,635	31	5,827,283	187,976	22	46.8
Summit (a)	1,613	16	596,696	37,294	11	101.0
Monarch (a)	1,550	22	706,199	32,013	16	67.4
Wisconsin Cent.*	1,489	34	5,630,912	165,615	27	41.4
Pioneer (a)	1,417	18	1,239,731	68,874	9	74.6
Southern*	1,367	23	1,664,104	72,352	10	62.1
Central	1,308	24	1,294,107	53,929	15	50.3
Iowa Airplane*	1,281	29	1,720,817	59,338	18	45.7
Southwest (a)	1,144	23	2,520,037	109,567	16	49.7
West Coast(a)	869	21	1,002,161	47,722	15	41.4
Empire (a)	694	15	282,776	18,852	9	49.6
Wiggins	657	22	2,273,553	103,343	14	27.4
Florida(a)	476	10	294,535	29,453	7	47.6
Totals	19,099	340	28,601,695	84,123	216	55.5

** Formerly Aviation Enterprises, Inc.
* To be certificated on showing of adequate airports.
(a) In active operation.
(Study prepared by A. L. Wheeler, Roberts & McInnis, Washington, D. C.)

ANOTHER AAA BEECHCRAFT

With this D18C Beechcraft—its third—All American Aviation, Inc. is bolstering its six-state airmail and air express service with twin engine equipment. Seen at left is line's president, Robert M. Love accepting final clearance papers from Beechcraft sales representative, Leddy Greever.

Common Carriers

International airlines have been urged by Sir William Hildred, director general of the International Air Transport Association, to become "the vehicle for the factory hand's holiday. The man in the street already looks upon the airliner as his chariot, and we must make it so for him," Sir William declared.

The IATA head admitted there is question of just how this can be accomplished. But he said a number of answers have been suggested and deserve careful study—first and second class service, tourist rates and special fares for school children and their teachers.

Soviet Balks KLM

The Soviet Union apparently has placed so many obstructions in the way of KLM's proposed Amsterdam-Berlin service that the Dutch airline is shelving plans for the operation. Russia reportedly agreed to the service only on condition that KLM submit to Soviet military headquarters names and identification of all passengers flying either way 14 days before the flight, plus complete data on the carrier's crews and planes.

Air Express Increases

Domestic air express shipments during the first six months of 1947 reached an all-time peak and were up 26.5 percent over the same 1946 period, Railway Express Agency reports. A total of 1,747,293 shipments were handled for 25 certificated airlines, compared with 1,381,088 in the first six months of 1946.

Northeast Analyzes System For CAB

Northeast Airlines, after a four-month study of its present system, has given CAB its recommendations for placing the operation on a sounder economic basis. The carrier has emphasized a need for southward extension of its routes and a delay in instituting service to a number of points for which it was certificated in the New England area decision last year.

NEA's report is the result of an investigation ordered by CAB in March to determine whether the carrier's increasing dependence on mail pay is due to uneconomic characteristics of its route pattern. The board had also expressed interest in finding whether mail payments could be decreased by postponing the start of new services.

▶ **Like Feeder System** – The short-haul nature of its system, extreme seasonal traffic variations and the necessity of conducting two distinct types of service were cited by NEA as reasons for high mail pay requirements. The carrier pointed out that its average hop is now 58 miles and that the average distance between stops would be reduced to only 36 miles–less than most feeders–if service is instituted to all points presently certificated to NEA.

Seasonal traffic variations find business 252 percent of normal in the best summer month and 18.2 percent of normal in the worst winter month. This situation, NEA declared, causes poor utilization of both personnel and equipment.

▶ **Different Pattern**–Cities are small and traffic is sparse on NEA routes north of Boston, requiring use of DC-3 equipment, while effective competition with Eastern Air Lines and American Airlines on the high-traffic Boston-New York link requires DC-4s, the report stated.

Addition of a New York-Washington link probably would reduce mail pay requirements, decrease extreme systemwide seasonal traffic variations and increase equipment utilization, according to NEA. On the other hand, the carrier suggested discontinuing service on its New York-Keene, N. H., route and delay in opening service to other certificated but still inactive points.

▶ **Cape Cod Route**–Consideration should be given to providing mail service exclusively with Stinson equipment to Cape Cod during the low traffic winter season, NEA said. With Trans-Canada Air Lines now providing serious competition to the maritime provinces, NEA suggested that its link to Moncton, New Brunswick, either be eliminated or extended to a stronger terminal.

Northeast disclosed it has conducted preliminary negotiations to purchase Convair 240s for use on the New York-Boston route to replace its DC-4s. Meanwhile, CAB has agreed to dismiss, without prejudice, the carrier's application for approval of a merger agreement with Capital Airlines (PCA).

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CARBURETORS
PD-12F2, PD-12F5,
PD-12H2, PD-12K6,
PT-13G1, PT-13G5,
1900-CPB-3

C-47, DC-3, C-54, DC-4

PARTS & ASSEMBLIES
Bungee-DC-3-2116965
Collector Rings-DC4
5174842 & 5174529
Eng. Mount Bolts—DC3
1116115, 1117771
Int. Wrench, Bolts—DC3&4
2076904 thru 2076907 Ser.
NAS-140 thru NAS-150 Ser.
Landing Gear Bolts—DC3
AN14-93, 1116409,
1116410, 1116955,
1117078, etc.
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1027300 & 1027307 Ser.
1027997 & 1029421 Ser.
1029679 & 124630 Ser.
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SK1292-1, 1118876, etc.
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1117059, 1131032,
1139096, 1143386,
1143538, 1205414,
134808, 2116354, &
all dash Nos.
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115888 124682 &
143908 Series.
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BC-733D, BC-1206,
BC-438, SCR-269,
SCR-274, etc.

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R680-9	R1830-43
R755-9	R1830-65
R985-48	R1830-90C
R985-50	R1830-92
R985-AN-1	R2600-13
R985-AN-3	R2800-43
V1710-81	R2800-51
V1710-99	R2800-75
R1820-97	R3350-35

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G-9, G-10, TFD-100,
TFD-8100, TFD-8200,
CH4103-23, Ceco 9103.

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SF14LC-7 & SF14LC-8
SF9LU-3, -7 & -8
SF14LN-8, etc.

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G1, D2, F1, & A4 Bottles
K1, & A-13 Gauges.

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54772-2, 54772-21, 1E280,
1E521, etc.

PROP. GOVERNORS
4G8-G23G, 4G8-G15,
4G8-G13, 4L1-GIJ,
4K11-GOJ, 4K11-GOL.

STARTERS
G-6, G-6A, E-80, F-2,
JH-3R, JH-4ER,
JH-5F, JH-5-B, etc.

VACUUM PUMPS
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119626-610-2

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613-2, 613-6, 557-5, etc.

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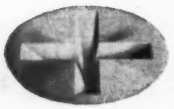

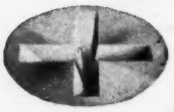

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EDITORIAL

Viewing the News

THE ACC REPORT—The latest report of the Air Coordinating Committee offers few surprises to those in aviation. The few new points are mainly an accumulation of loose ends. The reference to advantages of airline mergers is a reflection of Mr. Landis' philosophy.

Nevertheless, the report is an excellent, concise summary in 17 pages of the Executive branch's policies on all phases of commercial and military aviation. President Truman has already turned it over to his new Air Policy Commission as a primer for their studies.

FASTER ACCIDENT REPORTING—Observers note in the ACC report a plea for prompt issuance of accident investigation reports. CAB Chairman Landis has already stepped up the tempo of investigations but mainly in his capacity as Director of the President's Air Safety Committee. The Civil Aeronautics Board's small safety investigation staff already has been pushed almost beyond human endurance by its responsibilities to the President's Committee. The Truman group has released its own report on the Eastern Air Lines Port Deposit accident although the official CAB report has not yet been issued by CAB. It has also made recommendations based on studies of United's LaGuardia crash, and PCA's Leesburg accident. CAB has had the UAL report up for members' signatures for four weeks. In general, CAB has been releasing reports from six to eight months after crashes. Meanwhile, both CAB and CAA continue to send their own staffs to scenes of all major crashes, and each duplicates many investigations of the other. The present wording of the Civil Aeronautic Act, permitting both agencies to investigate accidents, paves the way for endless confusion and delay.

ALISON IS CRAMMING—John Alison is keeping mum and cramming these days like a late arriving student preparing for exams. The new Assistant Secretary of Commerce refused to commit himself on his current attitude toward most aviation problems the other day in an interview with AVIATION WEEK. That explains why the story about him in today's issue is mainly background. Probably no other Government official is being watched as closely by aviation. Alison realizes it. But he refuses to talk policy until he is ready. Then, he says, he will make decisions and stick by them. He is keenly aware of friction between CAA and many Government agencies and industry groups, and is a strong believer in improving personal relations to accomplish any task.

GAEL SULLIVAN DEPLORES AIRPORT CUT—The Democratic National Committee's News Letter last week takes a wallop at the GOP for its lack of faith in aviation. The writer is Gael Sullivan, now the Committee's Executive Director. Sullivan, whose departure as Second Assistant Postmaster General sent the P. O. Department back into its ancient lethargy air-wise, says:

"Republicans hold that it's all right for airplanes to fly—although they prefer a horse and buggy—but they think it's just Democratic propaganda that they need well-planned, skillfully operated airports to land.

"Sharp cuts by the Republican Congress for funds for airports all over the nation have reduced Federal aid for many cities by as much as 50 percent, even eliminated it entirely in some instances. Few cities have funds to replace the Federal help they will lose as a result of shortsighted Republican 'economy.' So the result is a sharp reduction in our rate of aeronautical progress. Yet we all know this program is vital to national defense."

TRUMAN BOARD BOGGING DOWN—The President's special Air Safety Board seems bogged down in the steamy Washington heat. After a strong and vigorous start sparked by CAB Chairman Landis and the airline pilots' representative, Bart Cox, the Board has been straying off into dead-end streets and losing its momentum down the broad road of immediate improvement of airline safety. Few official board members are attending meetings regularly. Substitutes are often in a majority. Consequently, few decisions are made. The board's biggest achievements to date are requiring absolute terrain clearance indicators; revision of the transport category to include the temperature factor in computing maximum take-off weights and stimulating thorough tests on the structure of converted C-54's that have given the airplane a clean bill of health after the ill-informed daily press sought an easy solution to three DC-4 accidents by pinning blame on the aircraft or its conversion. The board has yet to tackle such vital issues as addition of a flight engineer to the crew of four-engine transports, fire protection, and strident charges by pilots and airline operators of over-regulation by CAB-CAA.

DR. LEWIS BECOMES CONSULTANT—As this issue closed, came word of the appointment of Dr. Hugh Dryden, Associate Director of the National Bureau of Standards, as Director of Aeronautical Research for NACA. He replaces Dr. George W. Lewis, who has held this post for more than a quarter of a century. Dr. Lewis will retain his NACA connection as Research Consultant. He has marked up a distinguished record at NACA. He has won world-wide recognition in the highest aeronautical engineering circles during the most important, and trying, years in aviation history. Few really know of the diligence of his labors, to the detriment of his own health. We shall miss him, but are thankful that NACA will benefit from his experience.

ROBERT H. WOOD

A New Feature...

at the 1947 NATIONAL AIR RACES

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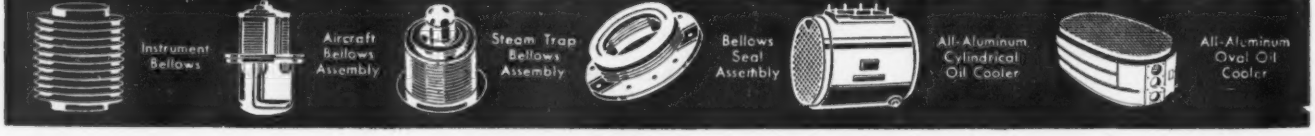
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